
Appendix D: Transportation Study

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1. Introduction

The District of Columbia, Division of Transportation (DDOT), proposes to investigate impacts of reopening the existing closed section of Kling Road between Cortland Place and Porter Street in the Northwest portion of Washington, D.C. A Traffic Engineering Study was conducted to evaluate traffic operations near the study area for various Options. Existing and future traffic analyses were conducted at critical locations within the Study Area. Future traffic operational conditions were analyzed for year 2017, for no build conditions as well as for three (3) build condition scenarios. They are as follows:

- Year 2017 no build conditions: Kling Road remains closed. (Also referred to as Options A through D)
- Year 2017 build conditions scenario 1: Rebuild Kling Road to its original (existing) alignment and dimensions and further repair/replace storm drainage to open for vehicular traffic. (Also referred to as Option E)
- Year 2017 build conditions scenario 2: Reconfigure Kling Road within existing right-of-way to improve alignment and drainage to open for vehicular traffic. (Also referred to as Option F)
- Year 2017 build conditions scenario 3: Build Kling Road as a one lane (one-way) road and a pedestrian/bicycle lane. (Also referred to as Option G)

DDOT in conjunction with the Washington DC Council of Governments (COG), provided traffic data for this study. In addition, several field studies and observations were made to assess traffic operations and to collect traffic data. This data was then used to establish existing and future conditions. Future traffic volumes were established based on the weighed trip share percentage from the roadways parallel to Kling Road and based on traffic volumes that were present on Kling Road prior to its closure.

Operational Level of Service (LOS) analyses were conducted for existing and future scenarios at critical intersections. Safety analysis and travel speed studies along the major roadways within the vicinity of the study area are also included in this report.

This report also serves to evaluate whether the reopening of Kling Road has specific merit from a traffic operational perspective. Although the primary purpose of the proposed project is related to non-traffic operational factors, the study addresses any additional benefits that could result from one or more of the build Options considered.

2. Project Description

Closed for traffic between Porter Street and Cortland Place in 1990, Kling Road, which extends east west in direction, is a two-lane road with one lane in each direction. Based on the traffic data collected in 1988 and the "Traffic Impact of Closing Kling Road on Porter Street" Study conducted in 1995, Kling Road carried approximately 3,200 vehicles per day and approximately 200 vehicles in each direction during peak hours when the roadway was open to traffic.

The road network surrounding Kling Road is currently experiencing excessive delays and poor level of service during peak hours, especially along roads parallel to Kling Road. The reopening of Kling Road has been suggested as one of the options to improve the east-west cross town traffic conditions, which provide access to the National Cathedral, American University, upper Georgetown, and the MacArthur Boulevard area. In order to evaluate the traffic impact of reopening Kling Road, the following intersections were considered for traffic operational analysis. They are as follows:

- Intersection of Connecticut Avenue and Porter Street
- Intersection of Cleveland Avenue/Garfield Street/32nd Street

- Intersection of 34th Street and Woodley Road
- Intersection of Woodley Road and Kling Road
- Intersection of Woodley Road and 32nd Street

Figure 1 shows the study area and key intersections analyzed for this study (Appendix D-3).

3. Existing Conditions

The traffic data used for the analysis was provided by the DDOT and verified by the staff of COG. Several field investigations were also conducted, supplementing this data, to establish the existing traffic conditions. A brief description of the five key intersections analyzed as a part of this study is presented in the following sections.

■ Intersection of Connecticut Avenue and Porter Street

The intersection of Connecticut Avenue and Porter Street is a four-leg intersection, controlled by a traffic signal. Connecticut Avenue is a six-lane street with a reversible center lane during the morning and evening peak periods of traffic operations. During the morning peak period, Connecticut Avenue provides four travel lanes for southbound traffic and two travel lanes for northbound. During the evening peak, Connecticut Avenue provides four travel lanes for northbound traffic and two travel lanes for southbound. The eastbound Porter Street approach has one two-foot wide travel lane. The westbound approach of Porter Street is composed of a left turn lane, a through lane and a dedicated right turn lane.

■ Intersection of Cleveland Avenue, Garfield Street and 32nd Street

The intersection of Cleveland Avenue, Garfield Street, and 32nd Street is a six-leg intersection controlled by a traffic signal. Cleveland Avenue is a divided street with two lanes in each direction to the southeast of the intersection, and one lane in each direction to the northwest of the intersection. In the northwest approach, Cleveland Avenue has a dedicated

left lane, a shared through and a right turn lane. Cleveland Avenue southeast approach has one shared left/through/right lane. Garfield Street extends in east-west direction. The eastbound approach of Garfield Street has one 24-foot travel lane in each direction. The westbound approach via Garfield Street is one way. 32nd Street runs north-south with one lane in each direction.

■ Intersection of 34th Street and Woodley Road

The intersection of 34th Street and Woodley Road is a four-leg signalized intersection. Woodley Road has one lane in each direction. Northbound 34th Street has two shared lanes. The southbound approach has one lane and left-turn movement is prohibited from 7:00 a.m. to 9:30 a.m. and again from 4:00 p.m. to 6:30 p.m.

■ Intersection of Kling Road and Woodley Road

The intersection of Woodley Road and Kling Road is an all-way stop sign controlled intersection with one lane on each approach.

■ Intersection of 32nd Street and Woodley Road

At the intersection of 32nd Street and Woodley Road, 32nd Street is controlled by a stop sign. Northbound 32nd Street extends in a north-south direction and terminates at Woodley Road. Woodley Road, posted for a speed limit of 25-miles per hour (mph) operates with one lane in each direction.

Photographs of the study locations are presented in Appendix D-1.

4. Traffic Volume Development Methodology

This section presents the methodology used to collect and develop traffic and transportation data within the study area. The traffic volume data collected was specifically used to establish existing and future traffic

volumes for the study locations. The proposed methodology is discussed in detail in the following sections.

4.1 Traffic Data Collection

The traffic data collected included manual turning movement counts, Automatic Traffic Recorder (ATR) counts, traffic classifications, physical inventories of the key intersections, and inventories of on-street parking. The data was used as the basis for analyzing the existing and future conditions of the study locations.

4.2 Development of Existing Traffic Volumes

Year 2000 existing traffic conditions were developed from the intersection turning movement counts provided by the DDOT. Field traffic data was summarized and analyzed to establish morning (AM) and evening (PM) peak hour traffic volumes. Figure 2 (Appendix D-3) depicts the existing AM peak hour traffic volumes at the intersection of Connecticut Avenue and Porter Street. Figure 3 depicts AM peak hour volumes at the other study locations west of Connecticut Avenue (Appendix D-3). These locations include the intersections of: 34th Street and Woodley Road, Cleveland Avenue/Garfield Street and 32nd Street, Woodley Road and Kling Road, and Woodley Road and 32nd Street. Figures 4 and 5 depict the PM peak hour traffic volumes for the same locations as discussed above (Appendix D-3).

4.3 Development of Traffic Volumes for Future Conditions

To evaluate the traffic impacts of opening Kling Road on the surrounding roadway network, future year traffic volumes were developed for no build conditions and three build condition scenarios. These future conditions include:

- Year 2017 no build condition: Kling Road remains closed.

- Year 2017 build conditions scenario 1: Rebuild Kling Road to its original (existing) alignment, dimensions and repair/replace storm drainage to open for vehicular traffic.
- Year 2017 build conditions scenario 2: Reconfigure Kling Road within existing right-of-way to improve alignment and drainage to open for vehicular traffic.
- Year 2017 build conditions scenario 3: Build Kling Road as a one lane (one-way) road and a pedestrian/bicycle lane.

4.3.1 No Build Traffic Volumes

Under the Year 2017 no build condition, it was assumed that Kling Road remains closed and the surrounding road network has the same traffic patterns as under existing conditions along with background growth rate for 2017.

To develop no build traffic volume forecasts for the year 2017, a growth rate of one percent per year was used. This annual traffic growth rate factor was provided by the DDOT based on traffic growth trends in the Metropolitan area. This growth factor was applied to the year 2000 traffic volumes to project year 2017 no build traffic volumes.

Assuming a compound growth of one percent per year between 2000 and 2017, the overall growth from year 2000 to year 2017 was estimated to be approximately 18 percent. Figures 6 and 7 depict the projected AM peak hour traffic volumes at the study intersections (Appendix D-3). Figures 8 and 9 depict the projected PM peak hour traffic volumes at the study intersections (Appendix D-3).

4.3.2 Scenario 1: Rebuild Kling Road to its Original Alignment

Under the Year 2017 build conditions scenario 1, it is assumed that Kling Road will be restored to its original alignment and dimensions and that repairs or replacements are made as needed to the storm drainage. In this scenario, Kling Road will regain the same function it had ten years ago. To develop traffic volumes under this condition for 2017, a traffic

diversion pattern was established. The methodology of developing traffic diversion patterns are summarized in the following steps:

Step 1: *Establish the future peak hour traffic volumes on Klingle Road based on data collected in 1988 prior to closing the roadway. This is accomplished by projecting the 1988 traffic data using an annual background growth rate factor of 1 percent per year, compounded. Based on 1998's 24-hour traffic counts, provided by DDOT, Klingle Road carried 102 and 213 vehicles during AM and PM peak hours heading eastbound and 193 and 138 vehicles heading westbound during AM and PM peak hours. It is assumed by the year 2017 traffic volumes on Klingle Road would increase at the same rate (1 percent per year) as the surrounding roadway network. Based upon the estimate, eastbound Klingle Road would carry approximately 136 and 284 vehicles in AM and PM peak hours, respectively, and westbound Klingle Road will carry 258 and 184 vehicles during AM and PM peak hours.*

Step 2: *Identify the parallel roadways from where traffic will be diverted to Klingle Road if Klingle Road was open. Based on the existing traffic analysis and field investigations, the parallel east-west roadways that would divert traffic to Klingle Road have been identified as Porter Street to the north, Woodley Road, Cathedral Avenue and Cleveland Avenue to the south.*

Step 3: *Based on the existing traffic volumes along parallel roadways of Klingle Road, calculate the trip share percentages as a proportion of total traffic volume in the area, as shown on Table 1. Throughout the preparation of this study, construction has been underway at the intersection of Porter Street and Klingle Road. Due to this construction, motorist travel patterns were assumed to be altered therefore accurate travel patterns data cannot be established. Therefore, trip share percentage method was applied to estimate future traffic diversion on Klingle Road. Based on existing traffic volumes on the surrounding roadway network, a weighted percentage of traffic volumes were calculated from each parallel roadway from where traffic will be diverted to Klingle Road. Weighted distribution factors were developed based on additional distance to be*

traveled. For example, cross-town traffic on Cleveland Avenue, Woodley Road and Cathedral Avenue has to use Duke Ellington Memorial Bridge to traverse in east-west direction. The distance from Klingle Road to the Duke Ellington Memorial Bridge is twice as long as the distance from Porter Street to Klingle Road. Therefore, weight factors were applied to the trip share percentage with Porter Street having a weight factor of 1 and all the south parallels have a weight factor of 0.5. Table 1 presents the trip share percentage calculations (Appendix D-3).

Step 4: *Calculate diverted traffic volumes on to Klingle Road from each of the parallel roadways in accordance with the calculated trip share percentages in Step 3. Apply the calculated trip share percentages to the future projected traffic volumes, which were calculated in Step 1 for Klingle Road. The diverted traffic volumes for scenario 1, from all the parallel roads, were calculated and presented on Table 2. Figure 10 depicts the traffic diversion volumes (Appendix D-3).*

By assigning the diversion traffic to the study network, build traffic volumes for scenario 1 were developed. Figures 11 and 12 depict the projected AM peak hour traffic volumes and Figures 13 and 14 depict the projected PM peak hour traffic volumes (Appendix D-3).

4.3.3 Scenario 2: Rebuild Klingle Road to Improved Alignment

Inherently, an improved alignment of a highway enhances capacity of the facility and thereby attracts more traffic. Under the build conditions Scenario 2, it is assumed that Klingle Road will be redesigned to improve features such as lane widths, shoulders, horizontal and vertical alignment, etc. These improvements will attract more traffic from its parallel routes. Based on the procedures outlined in the Highway Capacity Manual, it was determined that Klingle Road can accommodate up to 650 vehicles in both directions to operate at a Level of Service (LOS) D under typical conditions. Traffic volumes under this scenario would increase by approximately 35 percent more than the volumes estimated in Scenario 1. The resulting traffic volumes on Klingle Road under Scenario 2 would increase to 184 and 383 vehicles during AM and PM peak hours in the

eastbound direction, respectively, and 348 vehicles during AM peak hour and 248 vehicles during PM peak hour in the westbound direction. Applying the same methodology of scenario 1, traffic diversion was calculated as shown in Table 3 (Appendix D-3). Figure 15 shows the projected traffic diversion volumes for scenario 2 (Appendix D-3). Figures 16 through 19 delineate the projected scenario 2 volumes (Appendix D-3).

4.3.4 Scenario 3: Rebuild Kling Road to a One Lane (One-Way)

Under this scenario, it is assumed that Kling Road will be open to public for motor vehicle use as well as non-motorized use. One lane will be provided in the westbound direction, except from 4:00 PM to 6:30 PM, when a reverse in traffic operations (eastbound) would occur. The roadway alignment under this scenario would be on the existing alignment. Therefore, traffic using Kling Road during the AM would be approximately 258 vehicles per hour in the westbound direction and approximately 284 vehicles per hour in the eastbound direction during the PM. This scenario takes advantage of the travel directional difference, which is predominantly westbound during the AM and eastbound during the PM. This scenario also provides pedestrian and bicycle access in the east-west direction across the park. Figures 20 - 23 present projected traffic volumes during AM and PM peak hours under scenario 3 (Appendix D-3).

5. Intersection Capacity Analysis Methodology

Operational traffic analysis was conducted to determine existing and future traffic operations using the methodology outlined in the latest version of Transportation Research Board (TRB) Special Report 209, the "Highway Capacity Manual" (HCM). Level of service analysis was performed for the five study intersections. The Highway Capacity Manual delineates levels of service from A to F. Following is an explanation of the levels of service for signalized and unsignalized intersections as described in the HCM.

5.1 Level of Service for Signalized Intersections

Level of service (LOS) for a signalized intersection is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, LOS criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. Delay may be measured in the field or estimated using procedures outlined in the HCM. Delay is a complex measure and is dependent upon a number of variables, including the quality of progression, the cycle length, the green ratio, and volume to capacity (v/c) ratio for the lane group in question. The LOS criteria for signalized intersections is as follows:

LOS A describes operations with very low control delay, up to 10 seconds per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations with control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

LOS C describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with control delay greater than 55 and up to 80 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, or high v/c ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with control delay in excess of 80 seconds per vehicle. This level is often believed to be unacceptable to most drivers and occurs with over saturation, or, when arrival flow rates exceed the capacity of the intersection. This may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such delay levels.

Level of Service Criteria for Signalized Intersections

LEVEL OF SERVICE	STOPPED DELAY PER VEHICLE (SECONDS)
A	≤10.0
B	>10.0 AND ≤20.0
C	>20.0 AND ≤35.0
D	>35.0 AND ≤55.0
E	>55.0 AND ≤80.0
F	>80.0

5.2 Level of Service for Unsignalized Intersections

The capacity of an unsignalized intersection is evaluated in terms of critical gap size and the LOS is evaluated based on control delay per vehicle (in seconds per vehicle). Control delay includes initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay typically for a 15-minute analysis period. The LOS criteria for unsignalized intersections are defined in the 1997 HCM are as follows:

Level of Service Criteria for Unsignalized Intersections

LEVEL OF SERVICE	AVERAGE TOTAL DELAY (SEC/VEH)
A	≤10.0
B	>10.0 AND ≤15.0
C	>15.0 AND ≤25.0
D	>25.0 AND ≤35.0
E	>35.0 AND ≤50.0
F	>50.0

Average control delay of less than 10 seconds per vehicle is defined as LOS A, and an average control delay of 35 seconds per vehicle is the peak point between LOS D and E. The average control delays of LOS A, B, C and D are considered acceptable for unsignalized intersections, while those associated with LOS E and F are considered unacceptable. LOS F for unsignalized intersections is the result of average control delays in excess of 50 seconds per vehicle.

6. Existing Condition Analysis

6.1 Results of the Existing LOS Analysis

Tables 4 and 5 present the existing level of service for studied signalized intersections during AM and PM peak hours, respectively (Appendix D-3). Table 6 shows the existing AM and PM peak hour level of service for studied unsignalized intersections (Appendix D-3).

The analysis results revealed that Porter Street is experiencing excessive delays and poor level of service (LOS F). Both approaches of Cleveland Avenue at Garfield Street are also experiencing level of service F during AM peak hour. Additionally, Woodley Road eastbound operates with LOS F during AM peak hour. The results also indicate that the existing east-west cross-town roadways paralleling Kling Road are over crowded during the commuting peaks.

The existing traffic volumes at the unsignalized intersections of Woodley Road and Kling Road, and Woodley Road and 32nd Street are relatively low, partly due to the closure of Kling Road east of Cortland Place. In conclusion, the existing levels of service at these unsignalized locations are within acceptable levels.

6.2 Safety/Accident Analysis

The objective of the safety/accident analysis was to identify locations with a high number of accidents and further determine if a discernable pattern of accidents has occurred near the vicinity of the study area. The following locations were considered for the safety/accident analysis. It should be noted that accident data for intersection of Kling Road with Woodley Road does not exist.

- Intersection of Connecticut Avenue with Porter Street
- Intersection of Kling Road and Porter Street
- Intersection of 34th Street and Woodley Road

The analysis and the results of the analysis are discussed below.

6.2.1 Accident Data

For the analysis, accident data were obtained from Highway Safety Improvement Program, DDOT records for the years 1993, 1994, and 1995 (latest years summarized) for the study area. The data was summarized for the three years period according to the following accident types:

- Right Angle
- Right Turn
- Rear End
- Sideswipe
- Parked Car
- Fixed Object
- Pedestrian Accident
- Overtaking
- Backing

6.2.2 Results of the Accident Analysis

Over the three-year period between January 1993 and December 1995, 69 accidents occurred within the study area. None of these accidents was fatal. Table 7 provides a summary of accidents by year and type (Appendix D-3). As shown in the table, 33 accidents occurred in 1993; 19 occurred in 1994; and 17 occurred in 1995.

Of the 69 accidents that occurred during the three-year period, 56 accidents occurred at the intersection of Connecticut Avenue and Porter Avenue, one accident occurred at the intersection of Kling Road and Porter Street and 12 occurred at the intersection of 34th Street and Woodley Road. It should be noted that the highest number of accidents occurred at the intersection of Connecticut Avenue and Porter Avenue. At this intersection, during the three-year period, two types of accidents, sideswipe and rear-end collisions, stand out as being prevalent. Since the detailed police reports for the above accidents were not available at the time of the analysis, it is not possible to determine the actual cause of these accidents. However, the overall number of accidents occurring during the three-year period was relatively normal for the study area.

6.3 Travel Speed Study

Field investigations on travel speed were conducted on Connecticut Avenue and Porter Street during both peak periods and off peak periods.

Connecticut Avenue: Speed runs were performed on Connecticut Avenue in the northbound and the southbound directions during both the peak and non-peak periods. Average northbound travel speed during AM peak periods is 17.3 mph. The average southbound travel speed during PM peak periods is 21.4 mph. Off-peak northbound travel speed averages 17.5 mph and 15.7 mph for southbound. As it is evident from the above data, the peak period travel speeds do not show any reduction from those of off peak travel. This can be attributed to the four travel lanes during off peak periods with curb parking at both sides on Connecticut Avenue. Curb parking is not allowed during peak periods and two more travel lanes are

added to the heavier traffic direction. The reopening of Kling Road will significantly impact the travel speed on Connecticut Avenue.

Porter Street: Speed runs were also performed on Porter Street in the eastbound and westbound directions during peak and non-peak periods. It is important to note that Porter Street between Connecticut Avenue and Kling Road was under construction when the travel speed investigation was conducted. The construction has had a direct impact on people's travel patterns. Therefore, the results cannot accurately reflect the true-field operations. This section will have two travel lanes in each direction once construction is complete. If Kling Road were reopened, there would be stop delay reduction at the intersection of Porter Street and Connecticut Avenue, thereby improving travel speeds along Porter Street.

Summarized travel speed data is provided in Appendix D-2.

7. Future Condition Analysis

7.1 Results of LOS Analysis for No Build Conditions

Tables 8 and 9 present the no build level of service for the signalized intersections during AM and PM peak hours (Appendix D-3). Table 10 presents the no build level of service for the unsignalized intersections (Appendix D-3). Under the future no build conditions, level of service at all signalized intersections would continue to experience more delays when compared to the existing conditions. The intersection of 34th Street and Woodley Road would drop from LOS "D" to LOS "F" for the AM peak hour. The unsignalized intersections would continue to have acceptable level of services if the existing travel patterns were kept unchanged.

7.2 Results of LOS Analysis for Build Conditions Scenario 1

Results of the intersection levels of service analysis for build condition scenario 1 are presented in Tables 11 through 13 (Appendix D-3). Because of the traffic diversion, the roadways parallel to Kling Road would experience reduction in traffic volumes, thereby improving LOS. Although

most of the intersection approaches would continue to operate with the same level of service as under the no build condition, average vehicle delays and volume to capacity (v/c) ratio would be significantly reduced. At the intersection of Porter Street and Connecticut Avenue, for example, Porter Street eastbound would operate with a v/c ratio of 1.53 and 1.39 during AM and PM peak hours, respectively. This is compared to the 2.93 during the AM and 2.81 during the PM v/c ratios under no build conditions. Porter Street westbound through movement will reduce its delay from 150.3 sec/veh (LOS F) to 40 sec/veh (LOS D) during AM peak hour and 40.7 sec/veh (LOS D) to 29.7 sec/veh (LOS C) during PM peak hours. The overall intersection LOS would be improved from no build LOS of F to build LOS of E during both AM and PM peak hours.

The intersection of Cleveland Avenue, Garfield Street, and 32nd Street would also receive improvements to all approaches compared to the no build conditions, except for 32nd Street. However, these improvements would not be as significant as those of Porter Street. Table 14 shows the improved intersections and approaches (Appendix D-3).

Reopening of Kling Road would add diverted traffic to Woodley Road, thus negative traffic impacts are expected for intersections on Woodley Road. Results of level of service analyses conducted along Woodley Road are shown on Table 15 (Appendix D-3), reflecting deterioration of traffic operations due to the opening of Kling Road. As can be concluded from the comparisons, although there is increase in delay at the unsignalized intersections, these intersections and approaches will continue to operate with LOS D or better during both peak hours analyzed, except at the intersection with 34th Street. At this intersection, Woodley Road would continue to experience delays and operate at LOS F during the AM peak hour condition.

7.3 Results of LOS Analysis for Build Conditions Scenario 2

Tables 16 through 18 present the results of level of service under build conditions scenario 2 (Appendix D-3). Under this scenario, it is expected that Kling Road would carry more traffic as compared to the scenario 1,

thereby reducing traffic along its parallel routes and increased traffic volumes on Woodley Road.

The results indicate that the improvements in scenario 1 would experience further reduction in delay at most intersections. This does not include the intersection at Woodley Road at 34th Street, which would experience higher delays. The unsignalized intersections would operate with acceptable levels of service. The comparisons between no build and build scenario 2 conditions are presented in Tables 19 and 20 (Appendix D-3).

7.4 Results of LOS Analysis for Build Conditions Scenario 3

Results of LOS analysis conducted for this scenario are presented in Table 21 and 22 for signalized intersections and in Table 23 for unsignalized intersections (Appendix D-3). A review of these analyses indicate that traffic operations would improve in the westbound direction at the intersection of Connecticut Avenue and Porter Street during the AM peak hour and operations improve in the eastbound direction during the PM peak hour, compared to the no build scenario. Traffic operations at the intersection of 34th Street and Woodley Road would worsen in the westbound direction during the AM peak hour and in the eastbound direction during the PM peak hour. The unsignalized intersections would continue to operate at an acceptable LOS D or better.

8. Conclusion

As a part of the Options Analysis for the possible reopening of Kling Road, a traffic study was conducted. The study included a comprehensive data collection task and traffic operational analyses for existing and various future scenarios. Under the future scenarios, analyses were performed for no-build and three build scenarios. A traffic safety analysis was also conducted to determine safety concerns in the proximity of Kling Road.

Existing traffic operational analyses confirmed severe traffic congestion on east-west cross town roadways, which have received majority of diverted traffic resulting from the closure of Kling Road in 1990. This traffic

congestion is expected to worsen over the years, if Kling Road is to remain closed under the no-build condition.

For the future build conditions, traffic diversion patterns were assessed in order to quantify future operating conditions resulting from the opening of Kling Road. The analysis of build conditions was performed for three (3) scenarios. The results of scenarios 1 and 2 indicate that any reopening of Kling Road would lead to significant delay reduction on Porter Street and moderate delay reduction on Cleveland Avenue and Garfield Street. However, most of the already failed approaches at the study intersections will continue to operate with an unacceptable level of service. Woodley Road at 34th Street will experience a significant traffic volume increase and the already failed eastbound approach will experience more delays.

Of the five intersections analyzed in the study area, the results indicate that traffic operations at the intersection of Connecticut Avenue and Porter Street would experience the highest delays compared to the other intersections. As a part of this study, an analysis was conducted to determine various improvements required at this intersection for the design year under the no build scenario to achieve an acceptable level of traffic operation. Results of these analyses indicate that the eastbound approach of Porter Street needs to be widened to accommodate an additional two through lanes, while an additional through lane is needed in the westbound direction as well. Even if these improvements are implemented at this intersection, traffic congestion is expected to shift to other area intersections along Porter Street.

Results of the analysis conducted for scenario 3, indicate that the traffic operations would experience minimum improvements at the intersection of Connecticut Avenue and Porter Street as compared to Scenarios 1 and 2. The intersection of Cleveland Avenue and Garfield Street would experience minor improvements. However, scenario 3 takes advantage of travel directional differences during peak periods and provides an east-west bicycle/pedestrian transportation facility.

Safety analyses conducted in the study area reveal that there were approximately 69 crashes over a three-year period. The majority of these crashes, approximately 56, occurred at the intersection of Connecticut Avenue and Porter Street. Approximately 35 of the 56 crashes were either rear-end or sideswipe type crashes. These types of crashes are typical for an urban signalized intersection. In general, it is expected that the overall accidents in the study area could be reduced if Kling Road was open due to the diversion of traffic from the intersection of Connecticut Avenue and Porter Street.

In conclusion, build scenario 2 would result in the greatest improvement in terms of delay reduction at four of the key intersections analyzed, followed by build scenarios 1 and 3, respectively. However, actual level of service, particularly those that are already at LOS E or F would not be substantially improved in most cases.

**Transportation
Study
D-1: Photographs**

INTERSECTION OF CONNECTICUT AVENUE AND PORTER STREET



Porter Street Looking West at Connecticut Avenue



Connecticut Avenue Looking North at Porter Street

INTERSECTION OF CLEVELAND AVENUE, GARFIELD STREET, & 32ND STREET



Cleveland Avenue Looking South at Garfield Street



Cleveland Avenue Looking North at Garfield Street

INTERSECTION OF 34TH STREET AND WOODLEY ROAD



34th Street Looking South at Woodley Road



Woodley Road Looking East at 34th Street

INTERSECTION OF WOODLEY ROAD AND KLINGLE ROAD



Klinge Road Looking East at Woodley Road

INTERSECTION OF WOODLEY ROAD AND 32ND STREET



Woodley Road Looking West at 32nd Street

**Transportation
Study
D-2: Data
Summary Sheets**

HCS: Signalized Intersections Release 3.1c

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: Existing PM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	30	18	96	1	0	0	182	889	6	190	0	0
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Phase Combination		1	2	3	4	Signal Operations		5	6	7	8
EB	Left	P				NB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X					Peds	X			
WB	Left	P				SB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X					Peds	X			
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		25.0						53.0			
Yellow		4.0						4.0			
All Red		2.0						2.0			
Cycle Length: 90.0 secs											

Intersection Performance Summary

Appr/ Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 399 1437 0.47 0.278 31.0 C 31.0 C

Westbound

LTR 408 1470 0.01 0.278 23.6 C 23.6 C

Northbound

LTR 1613 2739 0.75 0.589 17.0 B 17.0 B

Southbound

TR 1134 1925 0.18 0.589 8.8 A 8.8 A

Intersection Delay = 17.7 (sec/veh) Intersection LOS = B

HCS: Signalized Intersections Release 3.1c

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: Existing AM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	12	17	260	1	0	0	57	460	2	954	18	0
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Phase Combination		1	2	3	4	Signal Operations		5	6	7	8
EB	Left	P				NB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X					Peds	X			
WB	Left	P				SB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X					Peds	X			
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		19.0						59.0			
Yellow		4.0						4.0			
All Red		2.0						2.0			
Cycle Length: 90.0 secs											

Intersection Performance Summary

Appr/ Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 304 1439 1.19 0.211 149.2 F 149.2 F

Westbound

LTR 273 1293 0.01 0.211 28.2 C 28.2 C

Northbound

LTR 1269 1936 0.48 0.656 9.1 A 9.1 A

Southbound

TR 1111 1694 0.97 0.656 35.8 D 35.8 D

Intersection Delay = 47.8 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.1c

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 No Build AM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	14	20	307	1	0	0	67	543	2	1126	21	
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right			
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right			
Peds	X				Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	19.0				59.0			
Yellow	4.0				4.0			
All Red	2.0				2.0			

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 303 1437 1.39 0.211 231.3 F 231.3 F

Westbound

LTR 249 1179 0.02 0.211 28.2 C 28.2 C

Northbound

LTR 1209 1845 0.58 0.656 10.7 B 10.7 B

Southbound

TR 1111 1694 1.09 0.656 69.5 E 69.5 E

Intersection Delay = 80.9 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.1c

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 No Build PM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	35	21	113	1	0	0	215	1049	7	224	0	
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right			
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right			
Peds	X				Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	25.0				53.0			
Yellow	4.0				4.0			
All Red	2.0				2.0			

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 398 1433 0.56 0.278 33.3 C 33.3 C

Westbound

LTR 404 1455 0.01 0.278 23.6 C 23.6 C

Northbound

LTR 1577 2678 0.87 0.589 22.1 C 22.1 C

Southbound

TR 1134 1925 0.21 0.589 9.1 A 9.1 A

Intersection Delay = 21.8 (sec/veh) Intersection LOS = C

HCS: Signalized Intersections Release 3.1c

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 Build AM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	14	156	271	1	258	0	34	543	2	1126	21	
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination				1	2	3	4	5	6	7	8
EB	Left	P						NB	Left	P	
	Thru	P							Thru	P	
	Right	P							Right	P	
	Peds	X							Peds	X	
WB	Left	P						SB	Left	P	
	Thru	P							Thru	P	
	Right	P							Right	P	
	Peds	X							Peds	X	
NB	Right							EB	Right		
SB	Right							WB	Right		
Green		19.0							59.0		
Yellow		4.0							4.0		
All Red		2.0							2.0		
Cycle Length: 90.0 secs											

Intersection Performance Summary

Appr/Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	
Eastbound							
LTR	298	1413	1.84	0.211	424.3 F	424.3 F	
Westbound							
LTR	366	1736	0.80	0.211	49.9 D	49.9 D	
Northbound							
LTR	1318	2011	0.50	0.656	9.3 A	9.3 A	
Southbound							
TR	1111	1694	1.09	0.656	69.5 E	69.5 E	

Intersection Delay = 124.6 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.2

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 Build PM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	35	305	82	1	184	0	176	1049	7	224	0	
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination				1	2	3	4	5	6	7	8	
EB	Left	P						NB	Left	P		
	Thru	P						Thru	P			
	Right	P						Right	P			
	Peds	X						Peds	X			
WB	Left	P						SB	Left	P		
	Thru	P							Thru	P		
	Right	P							Right	P		
	Peds	X							Peds	X		
NB	Right							EB	Right			
SB	Right							WB	Right			
Green	25.0								53.0			
Yellow	4.0								4.0			
All Red	2.0								2.0			
Cycle Length: 90.0 secs												

Intersection Performance Summary

Appr/Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	
Eastbound							
LTR	438	1577	1.16	0.278	126.2 F	126.2 F	
Westbound							
LTR	489	1759	0.48	0.278	30.4 C	30.4 C	
Northbound							
LTR	1606	2728	0.82	0.589	19.6 B	19.6 B	
Southbound							
TR	1134	1925	0.21	0.589	9.1 A	9.1 A	

Intersection Delay = 43.2 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.1c

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 Build AM Peak w Mitigatio
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	14	204	271	1	348	0	22	543	2	1126	21	
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Phase Combination		1	2	3	4	5	6	7	8
EB Left	P					NB Left	P		
Thru	P					Thru	P		
Right	P					Right	P		
Peds	X					Peds	X		
WB Left	P					SB Left	P		
Thru	P					Thru	P		
Right	P					Right	P		
Peds	X					Peds	X		
NB Right						EB Right			
SB Right						WB Right			
Green		19.0					59.0		
Yellow		4.0					4.0		
All Red		2.0					2.0		

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 277 1311 2.14 0.211 559.2 F 559.2 F

Westbound

LTR 368 1745 1.06 0.211 99.9 F 99.9 F

Northbound

LTR 1404 2141 0.45 0.656 8.7 A 8.7 A

Southbound

TR 1111 1694 1.09 0.656 69.5 E 69.5 E

Intersection Delay = 162.4 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.1c

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 Build PM Peak w Mitigatio
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	35	404	71	1	248	0	170	1049	7	224	0	
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Phase Combination		1	2	3	4	5	6	7	8
EB Left	P					NB Left	P		
Thru	P					Thru	P		
Right	P					Right	P		
Peds	X					Peds	X		
WB Left	P					SB Left	P		
Thru	P					Thru	P		
Right	P					Right	P		
Peds	X					Peds	X		
NB Right						EB Right			
SB Right						WB Right			
Green		25.0					53.0		
Yellow		4.0					4.0		
All Red		2.0					2.0		

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 431 1553 1.35 0.278 205.9 F 205.9 F

Westbound

LTR 488 1756 0.64 0.278 35.0- C 35.0- C

Northbound

LTR 1611 2736 0.81 0.589 19.3 B 19.3 B

Southbound

TR 1134 1925 0.21 0.589 9.1 A 9.1 A

Intersection Delay = 64.8 (sec/veh) Intersection LOS = E

HCS: Signalized Intersections Release 3.1c

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: Existing AM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	2	0	0	4	0
LGConfig	LTR			L T R			LTR			LTR		
Volume	14	412	48	119	464	229	0	557	76	229	2452	32
Lane Width	12.0			10.0 10.0 10.0			10.0			10.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination				1	2	3	4	5	6	7	8	
EB	Left	P						NB	Left	P		
	Thru	P							Thru	P		
	Right	P							Right	P		
	Peds	X							Peds	X		
WB	Left	P						SB	Left	P		
	Thru	P							Thru	P	P	
	Right	P							Right	P	P	
	Peds	X							Peds	X	X	
NB	Right							EB	Right			
SB	Right							WB	Right			
Green	26.0									27.0	27.0	
Yellow	4.0										4.0	
All Red	1.0									0.0	1.0	
Cycle Length: 90.0 secs												

Intersection Performance Summary

Appr/Lane	Lane Group	Adj Sat Flow Rate	Ratios		Lane Group	Approach	
Grp	Capacity	(s)	v/c	g/c	Delay LOS	Delay LOS	

Eastbound

LTR 284 984 2.14 0.289 557.0 F 557.0 F

Westbound

L 80 265 2.13 0.289 577.7 F
 T 497 1722 1.10 0.289 102.0 F 167.5 F
 R 418 1447 0.61 0.289 34.0 C

Northbound

LTR 969 3229 0.83 0.300 37.4 D 37.4 D

Southbound

LTR 3698 6164 0.78 0.600 15.3 B 15.3 B

Intersection Delay = 109.2 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.1c

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: Existing PM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	4	0	0	2	0
LGConfig	LTR			L T R			LTR			LTR		
Volume	27	540	22	100	262	83	12	1364	99	12	524	27
Lane Width	12.0			10.0 10.0 10.0			10.0			10.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination				Signal Operations				
	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P	P	
Right	P				Right	P	P	
Peds	X				Peds	X	X	
NB Right					EB Right			
SB Right					WB Right			
Green	25.0					16.0	39.0	
Yellow	4.0						4.0	
All Red	1.0					0.0	1.0	
Cycle Length: 90.0				secs				

Intersection Performance Summary

Appr/Lane	Lane Group	Adj Sat Flow Rate	Ratios		Lane Group	Approach	
Grp	Capacity	(s)	v/c	g/c	Delay LOS	Delay LOS	

Eastbound

LTR 351 1264 2.00 0.278 491.3 F 491.3 F

Westbound

L 80 275 1.50 0.278 311.9 F
 T 478 1722 0.64 0.278 35.1 D 95.8 F
 R 402 1447 0.26 0.278 26.9 C

Northbound

LTR 2505 5780 0.66 0.433 21.6 C 21.6 C

Southbound

LTR 1997 3268 0.30 0.611 8.7 A 8.7 A

Intersection Delay = 125.2 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.1c

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: 2017 No Build AM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	2	0	0	4	0
LGConfig	LTR			L T R			LTR			LTR		
Volume	17	486	57	140	548	270	0	657	90	270	2893	38
Lane Width	12.0			10.0 10.0 10.0			10.0			10.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	26.0				27.0			
Yellow	4.0				4.0			
All Red	1.0				0.0			

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/Lane	Lane Group	Adj Sat Flow Rate	Ratios		Lane Group	Approach	
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay LOS

Eastbound

LTR 228 788 2.93 0.289 910.3 F 910.3 F

Westbound

L 80 265 2.50 0.289 742.6 F
 T 497 1722 1.23 0.289 150.3 F 227.0 F
 R 418 1447 0.72 0.289 38.8 D

Northbound

LTR 967 3224 0.89 0.300 42.0 D 42.0 D

Southbound

LTR 3698 6164 0.92 0.600 20.9 C 20.9 C

Intersection Delay = 160.1 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.1c

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: 2017 No Build PM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	4	0	0	2	0
LGConfig	LTR			L T R			LTR			LTR		
Volume	32	637	26	118	309	98	14	1610	117	14	618	32
Lane Width	12.0			10.0 10.0 10.0			10.0			10.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	25.0				16.0			39.0
Yellow	4.0				4.0			
All Red	1.0				0.0			1.0

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/Lane	Lane Group	Adj Sat Flow Rate	Ratios		Lane Group	Approach	
Grp	Capacity	(s)	v/c	g/C	Delay	LOS	Delay LOS

Eastbound

LTR 294 1060 2.81 0.278 857.7 F 857.7 F

Westbound

L 80 275 1.77 0.278 426.8 F
 T 478 1722 0.76 0.278 40.7 D 125.2 F
 R 402 1447 0.31 0.278 27.7 C

Northbound

LTR 2497 5763 0.78 0.433 24.3 C 24.3 C

Southbound

LTR 1997 3268 0.36 0.611 9.2 A 9.2 A

Intersection Delay = 204.7 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.1c

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: 2017 Build AM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	2	0	0	4	0
LGConfig	LTR			L T R			LTR			LTR		
Volume	17	395	57	140	343	270	0	657	90	270	2893	38
Lane Width	12.0			10.0 10.0 10.0			10.0			10.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination				1	2	3	4	Phase Combination				5	6	7	8	
EB	Left			P				NB	Left			P				
	Thru			P					Thru			P				
	Right			P					Right			P				
	Peds			X					Peds			X				
WB	Left			P				SB	Left	P						
	Thru			P					Thru	P	P					
	Right			P					Right	P	P					
	Peds			X					Peds	X	X					
NB	Right							EB	Right							
SB	Right							WB	Right							
Green				26.0								27.0	27.0			
Yellow				4.0									4.0			
All Red				1.0								0.0	1.0			
Cycle Length: 90.0				secs												

Intersection Performance Summary

Appr/Lane	Lane	Adj Sat	Ratios		Lane Group	Approach	
Grp	Capacity	Flow Rate (s)	v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 367 1272 1.53 0.289 282.1 F 282.1 F

Westbound

L 80 265 2.50 0.289 742.6 F
 T 497 1722 0.77 0.289 40.0 D 199.1 F
 R 418 1447 0.72 0.289 38.8 D

Northbound

LTR 967 3224 0.89 0.300 42.0 D 42.0 D

Southbound

LTR 3698 6164 0.92 0.600 20.9 C 20.9 C

Intersection Delay = 77.3 (sec/veh) Intersection LOS = E

HCS: Signalized Intersections Release 3.1c

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: 2017 Build PM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	4	0	0	2	0
LGConfig	LTR			L T R			LTR			LTR		
Volume	32	411	26	118	179	98	14	1610	117	14	618	32
Lane Width	12.0			10.0 10.0 10.0			10.0			10.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination				1	2	3	4	5	6	7	8
EB	Left	P						NB	Left	P	
	Thru	P							Thru	P	
	Right	P							Right	P	
	Peds	X							Peds	X	
WB	Left	P						SB	Left	P	
	Thru	P							Thru	P	P
	Right	P							Right	P	P
	Peds	X							Peds	X	X
NB	Right							EB	Right		
SB	Right							WB	Right		
Green		25.0							16.0	39.0	
Yellow		4.0								4.0	
All Red		1.0							0.0	1.0	
Cycle Length: 90.0 secs											

Intersection Performance Summary

Appr/Lane	Lane	Adj Sat	Ratios		Lane Group	Approach	
Grp	Capacity	Flow Rate (s)	v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 401 1445 1.39 0.278 223.4 F 223.4 F

Westbound

L 80 275 1.77 0.278 426.8 F
 T 478 1722 0.44 0.278 29.7 C 147.4 F
 R 402 1447 0.31 0.278 27.7 C

Northbound

LTR 2497 5763 0.78 0.433 24.3 C 24.3 C

Southbound

LTR 1997 3268 0.36 0.611 9.2 A 9.2 A

Intersection Delay = 67.4 (sec/veh) Intersection LOS = E

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL (TWSC) ANALYSIS.

Analyst: ID
Intersection: Woodley Rd. & 32nd St.
Count Date:
Time Period: Existing AM

Intersection Orientation: East-West Major St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	2	0	0	4	0
LGConfig		LTR		L	T	R		LTR			LTR	
Volume	17	363	57	140	272	270	0	657	90	270	2893	38
Lane Width		12.0		10.0	10.0	10.0		10.0			10.0	
RTOR volth			0			0			0			0

Duration	0.25	Area Type: All other areas
----------	------	----------------------------

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X					Peds	X			
WB	Left	P				SB	Left	P			
	Thru	P					Thru	P	P		
	Right	P					Right	P	P		
	Peds	X					Peds	X	X		
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		26.0						27.0	27.0		
Yellow		4.0							4.0		
All Red		1.0						0.0	1.0		
Cycle Length: 90.0		secs									

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Flow (s)	Sat Rate	Ratios		Summary		Approach	
				v/c	g/c	Delay	LOS	Delay	LOS

Eastbound								
LTR	421	1456	1.24	0.289	158.8	F	158.8	F
Westbound								
L	80	265	2.50	0.289	742.6	F		
T	497	1722	0.61	0.289	33.0	C	212.2	F
R	418	1447	0.72	0.289	38.8	D		
Northbound								
LTR	967	3224	0.89	0.300	42.0	D	42.0	D
Southbound								
LTR	3698	6164	0.92	0.600	20.9	C	20.9	C

Intersection Delay = 64.5 (sec/veh) Intersection LOS = E

Vehicle Volume Data:

Movement:	2	3	4	5	7	9
Volume:	1	71	0	5	2	0
MPR:	4	118	0	9	4	0
MPF:	0.25	0.60	1.00	0.51	0.50	1.00
MPV:	0.00	0.03	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:

Lane width:

Walk speed:

Blockage:

Median Type: None

of vehicles: 0

Flared approach Movements:

of vehicles: Northbound 0

of vehicles: Southbound 0

lane usage for movements 1,2&3 approach:

Lane 1			Lane 2			Lane 3		
L	T	R	L	T	R	L	T	R
N	Y	Y	N	N	N	N	N	N

Channelized: N

Grade: 0.00

Lane usage for movements 4, 5 & 6 approach:

Lane 1			Lane 2			Lane 3		
L	T	R	L	T	R	L	T	R
Y	Y	N	N	N	N	N	N	N

Channelized: N

Grade: 0.00

Lane usage for movements 7, 8 & 9 approach:

Lane 1			Lane 2			Lane 3		
L	T	R	L	T	R	L	T	R
Y	N	Y	N	N	N	N	N	N

Channelized: N

Grade: 0.03

Lane usage for movements 10,11&12 approach:

Lane 1			Lane 2			Lane 3		
L	T	R	L	T	R	L	T	R
N	N	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	5
Shared in volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c,base	4.1	7.1	6.2
t c,hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
t c,g		0.2	0.1
G	0.00	0.00	0.00
t 3,lt	0.0	0.7	0.0
t c,T			
1 stage	0.00	0.00	0.00

t c			
1 stage	4.1	6.4	6.2

Follow Up Time Calculations:

Movement	4	7	9
t f,base	2.2	3.5	3.3
t f,HV	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St. 9 12

Conflicting Flows	63
Potential Capacity	1007
Pedestrian Impedance Factor	1.00
Movement Capacity	1007
Probability of Queue free St.	1.00

Step 2: LT from Major St. 4 1

Conflicting Flows	122
Potential Capacity	1477
Pedestrian Impedance Factor	1.00
Movement Capacity	1477
Probability of Queue free St.	1.00
Maj. L. Shared In. Prob. Queue Free St	1.00

Step 4: LT from Minor St. 7 10

Conflicting Flows	73
Potential Capacity	936
Pedestrian Impedance Factor	1.00
Maj. L. Min T Impedance factor	1.00
Maj. L. Min T Adj. Imp Factor.	1.00
Cap. Adj. factor due to Impeding mvmt	1.00
Movement Capacity	936

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations

Movement	7	8	9	10	11	12
v(vph)	4	0				
Movement Capacity	936	1007				
Shared Lane Capacity	936					

Worksheet 10 delay,queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v(vph)			4					
C m(vph)	1477		936					
v/c			0.00					
95% queue length								
Control Delay			8.9					
LOS			A					
Approach Delay				8.9				
Approach LOS				A				

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations

Movement	2	5
P o j	1.00	1.00
V i1	0	5
V i2	0	0
S i1	1700	1700
S i2	1700	1700
P* 0 j	1.00	1.00
D maj left	0.0	0.0
N number major st lanes	1	1
Delay, rank 1 mvmts	0.0	0.0

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: lb
 Intersection: Woodley Rd. & 32nd St.
 Count Date:
 Time Period: Existing PM
 Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	3	4	5	7	9
Volume:	15	35	0	5	2	0
HPR:	25	58	0	9	4	0
PHF:	0.60	0.60	1.00	0.53	0.50	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
 Lane width:
 Walk speed:
 % Blockage:

Median Type: None
 # of vehicles: 0

Planned approach Movements:

of vehicles: Northbound 0
 # of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	Y	Y	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	Y	N	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	N	Y	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 10,11&12 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	N	N	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	5
Shared in volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c,base	4.1	7.1	6.2
t c,hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
t c,g		0.2	0.1
G	0.00	0.00	0.00
t s,lt	0.0	0.7	0.0
t c,T:			
1 stage	0.00	0.00	0.00

t c			
1 stage	4.1	6.4	6.2

Follow Up Time Calculations:

Movement	4	7	9
t f,base	2.2	3.5	3.3
t f,HV	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St. 9 12

Conflicting Flows	54
Potential Capacity	1019
Pedestrian Impedance Factor	1.00
Movement Capacity	1019
Probability of Queue free St.	1.00

Step 2: LT from Major St. 4 1

Conflicting Flows	83
Potential Capacity	1526
Pedestrian Impedance Factor	1.00
Movement Capacity	1526
Probability of Queue free St.	1.00
Maj. L Shared In. Prob. Queue Free St.	1.00

Step 4: LT from Minor St.

	7	10
Conflicting Flows	64	
Potential Capacity	947	
Pedestrian Impedance Factor	1.00	
Maj. L, Min T Impedance factor	1.00	
Maj. L, Min T Adj. Imp Factor	1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	
Movement Capacity	947	

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations

Movement	7	8	9	10	11	12
v(vph)	4	0				
Movement Capacity	947	1019				
Shared Lane Capacity	947					

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v(vph)			4					
C m(vph)	1526	947						
V/c		0.00						
95% queue length								
Control Delay			8.8					
LOS			A					
Approach Delay				8.8				
Approach LOS				A				

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations

Movement	2	5
P o j	1.00	1.00
V i1	0	5
V i2	0	0
S i1	1700	1700
S i2	1700	1700
P* O j	1.00	1.00
O maj left	0.0	0.0
N number major st lanes	1	1
Delay, rank 1 mvmnt	0.0	0.0

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: lb
Intersection: Woodley Rd. & 32nd St.
Count Date:
Time Period: No Build AM

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	3	4	5	7	9
Volume:	1	84	0	5	2	0
RFR:	4	140	0	9	4	0
PHF:	0.25	0.60	1.00	0.53	0.50	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
Lane width:
Walk speed:
Blockage:

Median Type: None
of vehicles: 0

Flared approach Movements:

of vehicles: Northbound 0
of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	Y	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	N	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 10,11&12 approach:

Lane 1			Lane 2			Lane 3		
L	T	R	L	T	R	L	T	R
N	N	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	5
Shared in volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c, base	4.1	7.1	6.2
t c, hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
t c, g		2.2	0.1
G	0.00	0.00	0.00
t 3, lt	0.0	0.7	0.0
t c, T:			
1 stage	0.00	0.00	0.00
t c			
1 stage	4.1	6.4	6.2

Follow Up Time Calculations:

Movement	4	7	9
t f, base	2.2	3.5	3.3
t f, HV	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	74	
Potential Capacity	993	
Pedestrian Impedance Factor	1.00	
Movement Capacity	993	
Probability of Queue free St.	1.00	

Step 2: LT from Major St.	4	1
Conflicting Flows	144	
Potential Capacity	1451	
Pedestrian Impedance Factor	1.00	
Movement Capacity	1451	
Probability of Queue free St.	1.00	
Maj. L Shared In. Prob. Queue Free St.	1.00	

Step 4: LT from Minor St.

	7	10
Conflicting Flows	83	
Potential Capacity	923	
Pedestrian Impedance Factor	1.00	
Maj. L. Min T Impedance factor	1.00	
Maj. L. Min T Adj. Imp Factor	1.00	
Cap. Adj. factor due to Impeding mvmt	1.00	
Movement Capacity	923	

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations	7	8	9	10	11	12
Movement						
V(vph)	4		0			
Movement Capacity	923		993			
Shared Lane Capacity	923					

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
V(vph)			4					
C m(vph)	1451	923						
V/c		0.00						
55% queue length								
Control Delay		8.9						
LOS		A						
Approach Delay			8.9					
Approach LOS			A					

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations	2	5
Movement		
P o j	1.00	1.00
V i1	0	5
V i2	0	0
S i1	1700	1700
S i2	1700	1700
P* O j	1.00	1.00
D maj left	0.0	0.0
N number major st lanes	1	1
Delay, rank 1 mvmts	0.0	0.0

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: lb
 Intersection: Woodley Rd. & 32nd St.
 Count Date:
 Time Period: No Build PM

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	3	4	5	7	9
Volume:	18	41	0	5	2	0
HFR:	39	68	0	9	4	0
PHF:	0.60	0.60	1.00	0.53	0.50	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
 Lane width:
 Walk speed:
 Blockage:

Median Type: None
 # of vehicles: 0

Plared approach Movements:

of vehicles: Northbound 0
 # of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	Y	Y	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	Y	N	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	N	Y	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 10,11&12 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	N	N	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared ln volume, major th vehicles:	0	5
Shared ln volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c,base	4.1	2.1	6.2
t c,hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
t c,g		0.2	0.1
G	0.00	0.00	0.00
t 3,lt	0.0	0.7	0.0
t c,t			
l stage	0.00	0.00	0.00

t c
 l stage 4.1 6.4 6.2

Follow Up Time Calculations:

Movement	4	7	9
t f,base	2.2	3.5	3.3
t f,HV	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St. 9 12

Conflicting Flows	64
Potential Capacity	1006
Pedestrian Impedance Factor	1.00
Movement Capacity	1006
Probability of Queue free St.	1.00

Step 2: LT from Major St. 4 1

Conflicting Flows	98
Potential Capacity	1507
Pedestrian Impedance Factor	1.00
Movement Capacity	1507
Probability of Queue free St.	1.00
Maj. L Shared ln. Prob. Queue Free St.	1.00

Step 4: LT from Minor St.	7	10
Conflicting Flows	74	
Potential Capacity	935	
Pedestrian Impedance Factor	1.00	
Maj. L, Min T Impedance factor	1.00	
Maj. L, Min T Adj. Imp Factor	1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	
Movement Capacity	935	

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations						
Movement	7	8	9	10	11	12
v(vph)	4		0			
Movement Capacity	935		1006			
Shared Lane Capacity	935					

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v(vph)			4					
Cm(vph)	1507		935					
v/c			0.00					
95% queue length								
Control Delay			8.9					
LOS			A					
Approach Delay				8.9				
Approach LOS				A				

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations			
Movement	2	5	
P o j	1.00	1.00	
V i1	0	5	
V i2	0	0	
S i1	1700	1700	
S i2	1700	1700	
P* o j	1.00	1.00	
D maj left	0.0	0.0	
N number major st lanes	1	1	
Delay, rank 1 mvmts	0.0	0.0	

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: lb
Intersection: Woodley Rd. & 32nd St.
Count Date:
Time Period: Build sl AM

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	3	4	5	7	9
Volume:	137	84	0	263	2	0
NFR:	171	140	0	329	4	0
PHF:	0.80	0.60	1.00	0.80	0.50	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
Lane width:
Walk speed:
% Blockage:

Median Type: None
of vehicles: 0

Flared approach Movements:

of vehicles: Northbound 0
of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3	
	L	T	R	L	T	R	L	R
	N	Y	Y	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3	
	L	T	R	L	T	R	L	R
	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3	
	L	T	R	L	T	R	L	R
	Y	N	Y	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 10,11&12 approach:

Lane 1			Lane 2			Lane 3		
L	T	R	L	T	R	L	T	R
N	N	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared ln volume, major th vehicles:	0	263
Shared ln volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c,base	4.1	7.1	6.2
t c,hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
t c,g		0.2	0.1
G	0.00	0.00	0.00
t 3,lc	0.3	0.7	0.0
t c,T:			
l stage	0.00	0.00	0.00

t c
l stage 4.1 6.4 6.2

Follow Up Time Calculations.

Movement	4	7	9
t f,base	2.2	3.5	3.3
t f,hv	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	241	
Potential Capacity	803	
Pedestrian Impedance Factor	1.00	
Movement Capacity	803	
Probability of Queue free St.	1.00	

Step 2: LT from Major St.	4	1
Conflicting Flows	311	
Potential Capacity	1261	
Pedestrian Impedance Factor	1.00	
Movement Capacity	1261	
Probability of Queue free St.	1.00	
Maj. L Shared ln. Prob. Queue Free St.	1.00	

Step 4: LT from Minor St.

	7	10
Conflicting Flows	570	
Potential Capacity	486	
Pedestrian Impedance Factor	1.00	
Maj. L. Min T Impedance factor	1.00	
Maj. L. Min T Adj. Imp Factor	1.00	
Cap. Adj. factor due to impeding mvmt	1.00	
Movement Capacity	486	

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations	7	8	9	10	11	12
Movement						
v(vph)	4		0			
Movement Capacity	486		803			
Shared Lane Capacity	486					

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v(vph)			4					
C m(vph)	1261		486					
v/c			0.01					
95% queue length								
Control Delay			12.5					
LOS			B					
Approach Delay					12.5			
Approach LOS					B			

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations	2	5
Movement		
P o j	1.00	1.00
V i1	0	263
V i2	0	0
S i1	1700	1700
S i2	1700	1700
P* o j	1.00	1.00
D maj left	0.0	0.0
N number major st lanes	1	1
Delay, rank 1 mvmts	0.0	0.0

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: lb
Intersection: Woodley Rd. & 32nd St.
Count Date:
Time Period: Build #1 PM

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	3	4	5	7	9
Volume:	302	41	0	190	2	0
RFR:	355	60	0	238	4	0
PHF:	0.85	0.60	1.00	0.80	0.50	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
Lane width:
Walk speed:
Blockage:

Median Type: None
of vehicles: 0

Flared approach Movements:

of vehicles: Northbound 0
of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	Y	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	N	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 10,11&12 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	N	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	190
Shared in volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c,base	4.1	7.1	6.2
t c,hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
L c,g		0.2	0.1
G	0.00	0.00	0.00
t c,lt	0.0	0.7	0.0
t c,T:			
1 stage	0.00	0.00	0.00
L c			
1 stage	4.1	6.4	6.2

Follow Up Time Calculations:

Movement	4	7	9
t f,base	2.2	3.5	3.3
t f,HV	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	369	
Potential Capacity	663	
Pedestrian Impedance Factor	1.00	
Movement Capacity	663	
Probability of Queue free St.	1.00	

Step 2: LT from Major St.	4	1
Conflicting Flows	424	
Potential Capacity	1146	
Pedestrian Impedance Factor	1.00	
Movement Capacity	1146	
Probability of Queue free St.	1.00	
Maj. L Shared In. Prob. Queue Free St.	1.00	

Step 4: LT from Minor St.

7 10

Conflicting Flows	627
Potential Capacity	451
Pedestrian Impedance Factor	1.00
Maj. L. Min T Impedance factor	1.00
Maj. L. Min T Adj. Imp Factor	1.00
Cap. Adj. factor due to Impeding mvmt	1.00
Movement Capacity	451

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations

Movement 7 8 9 10 11 12

v(vph)	4	0
Movement Capacity	451	553
Shared Lane Capacity	451	

Worksheet 10 delay, queue length, and LOS

Movement 1 4 7 8 9 10 11 12

v(vph)	4
C m(vph)	1146 451
v/c	0.01
95% queue length	
Control Delay	13.1
LOS	B
Approach Delay	13.1
Approach LOS	B

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations

Movement	2	5
P o j	1.00	1.00
V i l	0	190
V i 2	0	0
S i l	1700	1700
S i 2	1700	1700
P* O j	1.00	1.00
D maj left	0.0	0.0
N number major st lanes	1	1
Delay, rank 1 mvmts	0.0	0.0

HCS: Unsignalized Intersections Release 3.1c

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: lb
Intersection: Woodley Rd. & 32nd St.
Count Date:
Time Period: Build #2 AM

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	3	4	5	7	9
Volume:	205	84	0	351	2	0
HPR:	256	140	0	413	4	0
PRF:	0.80	0.60	1.00	0.85	0.50	1.00
PRV:	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:

Flow:
Lane width:
Walk speed:
% Blockage:

Median Type: None
of vehicles: 0

Placed approach Movements:

of vehicles: Northbound 0
of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	Y	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	Y	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	N	Y	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Lane usage for movements 10,11&12 approach:

Lane 1			Lane 2			Lane 3		
L	T	R	L	T	R	L	T	R
N	N	N	N	N	N	N	N	N

Channelized: N
Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared in volume, major th vehicles:	0	351
Shared in volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c,base	4.1	7.1	6.2
t c,hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
t c,g		0.2	0.1
G	0.00	0.00	0.00
t 3,lt	0.0	0.7	0.0
t c,T:			
l stage	0.00	0.00	0.00
t c			
l stage	4.1	6.4	6.2

Follow Up Time Calculations:

Movement	4	7	9
t f,base	2.2	3.5	3.3
t f,HV	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St.	9	12
Conflicting Flows	326	
Potential Capacity	720	
Pedestrian Impedance Factor	1.00	
Movement Capacity	720	
Probability of Queue free St.	1.00	

Step 2: LT from Major St.	4	1
Conflicting Flows	396	
Potential Capacity	1173	
Pedestrian Impedance Factor	1.00	
Movement Capacity	1173	
Probability of Queue free St.	1.00	
Maj. L Shared In. Prob. Queue Free St.	1.00	

Step 4: LT from Minor St.

	7	10
Conflicting Flows	739	
Potential Capacity	387	
Pedestrian Impedance Factor	1.00	
Maj. L, Min T Impedance factor	1.00	
Maj. L, Min T Adj. Imp Factor	1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	
Movement Capacity	387	

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations	7	8	9	10	11	12
Movement						
v(vph)	4		0			
Movement Capacity	387		720			
Shared Lane Capacity	387					

Worksheet 10 delay,queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v(vph)			4					
C m(vph)	1173		387					
v/c			0.01					
95% queue length								
Control Delay			14.4					
LOS			D					
Approach Delay				14.4				
Approach LOS				B				

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations	2	5
Movement		
P o j	1.00	1.00
V i1	0	351
V i2	0	0
S i1	1700	1700
S i2	1700	1700
P* Oj	1.00	1.00
D maj left	0.0	0.0
N number major st lanes	1	1
Delay, rank 1 mvmts	0.0	0.0

TWO-WAY STOP CONTROL(TWSC) ANALYSIS

Analyst: lb
 Intersection: Woodley Rd. & 32nd St.
 Count Date:
 Time Period: Build sz PM

Intersection Orientation: East-West Major St.

Vehicle Volume Data:

Movements:	2	3	4	5	7	9
Volume:	401	41	0	251	2	0
HFR:	456	68	0	314	4	0
PHF:	0.88	0.60	1.00	0.80	0.50	1.00
PHV:	0.00	0.00	0.00	0.00	0.00	0.00

Pedestrian Volume Data:

Movements:
 Flow:
 Lane width:
 Walk speed:
 % Blockage:

Median Type: None
 # of vehicles: 0

Flared approach Movements:

of vehicles: Northbound 0
 # of vehicles: Southbound 0

Lane usage for movements 1,2&3 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	Y	Y	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 4,5&6 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	Y	N	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 7,8&9 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	Y	N	Y	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Lane usage for movements 10,11&12 approach:

	Lane 1			Lane 2			Lane 3		
	L	T	R	L	T	R	L	T	R
	N	N	N	N	N	N	N	N	N

Channelized: N
 Grade: 0.00

Data for Computing Effect of Delay to Major Street Vehicles:

	Eastbound	Westbound
Shared ln volume, major th vehicles:	0	251
Shared ln volume, major rt vehicles:	0	0
Sat flow rate, major th vehicles:	1700	1700
Sat flow rate, major rt vehicles:	1700	1700
Number of major street through lanes:	1	1

Length of study period, hrs: 0.25

Worksheet 4 Critical Gap and Follow-up time calculation.

Critical Gap Calculations:

Movement	4	7	9
t c,base	4.1	7.1	6.2
t c,hv	1.0	1.0	1.0
P hv	0.00	0.00	0.00
t c,g		0.2	0.1
G	0.00	0.00	0.00
t 3.lt	0.0	0.7	0.0
t c,T			
l stage	0.00	0.00	0.00
t c			
l stage	4.1	6.4	6.2

Follow Up Time Calculations:

Movement	4	7	9
t f,base	2.2	3.5	3.3
t f,HV	0.9	0.9	0.9
P hv	0.00	0.00	0.00
t f	2.2	3.5	3.3

Worksheet 6 Impedance and capacity equations

Step 1: RT from Minor St. 9 12

Conflicting Flows	490
Potential Capacity	582
Pedestrian Impedance Factor	1.00
Movement Capacity	582
Probability of Queue free St.	1.00

Step 2: LT from Major St. 4 1

Conflicting Flows	524
Potential Capacity	1053
Pedestrian Impedance Factor	1.00
Movement Capacity	1053
Probability of Queue free St.	1.00
Maj. L Shared ln. Prob. Queue Free St.	1.00

Step 4: LT from Minor St.	7	10
Conflicting Flows	804	
Potential Capacity	355	
Pedestrian Impedance Factor	1.00	
Maj. L. Min T Impedance Factor	1.00	
Maj. L. Min T Adj. Imp Factor	1.00	
Cap. Adj. factor due to Impeding mvmnt	1.00	
Movement Capacity	355	

Worksheet 8 Shared Lane Calculations

Shared Lane Calculations						
Movement	7	8	9	10	11	12
v(vph)	4		0			
Movement Capacity	355		582			
Shared Lane Capacity	355					

Worksheet 10 delay, queue length, and LOS

Movement	1	4	7	8	9	10	11	12
v(vph)		4						
C m(vph)	1053	355						
v/c		0.01						
95% queue length		15.3						
Control Delay		C						
LOS								
Approach Delay			15.3					
Approach LOS			C					

Worksheet 11 Shared Major LT Impedance and Delay

Rank 1 Delay Calculations				
Movement	2	5		
P o j	1.00	1.00		
V i 1	0	251		
V i 2	0	0		
S i 1	1700	1700		
S i 2	1700	1700		
P* O j	1.00	1.00		
D maj left	0.0	0.0		
N number major st lanes	1	1		
Delay, rank 1 mvmts	0.0	0.0		

HCS: Unsignalized Intersections Release 3.1c

ALL-WAY STOP CONTROL (AKSC) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst:	LB
2. Intersection:	Woodley Rd. & Klinge Rd.
3. Count Date:	
4. Time Period:	Existing AM Peak

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	1	0	0
2. TH Volume:	3	0	6	0
3. RT Volume:	0	0	0	2
4. Peak Hour Factor:	0.75	0.25	0.50	0.50
5. Flow Rate LT:	0	4	0	0
6. Flow Rate TH:	4	0	12	0
7. Flow Rate RT:	0	0	0	4
8. Flow Rate Total:	4	4	12	4
9. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	4	12	4
2. Flow Rate LT:	0	4	0	0
3. Flow Rate RT:	0	0	0	4
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hHV-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.20	0.00	-0.60

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	4	12	4
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.00	0.01	0.00
4. hd, final value	3.9	4.1	3.9	3.3
5. x, final value	0.00	0.00	0.01	0.00
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	1.9	2.1	1.9	1.3

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	4	12	4
2. Service Time	1.9	2.1	1.9	1.3
3. Degree Utilization, x	0.00	0.00	0.01	0.00
4. Departure headway, hd	3.9	4.1	3.9	3.3
5. Capacity	911	867	916	1079
6. Delay	7.0	7.2	7.0	6.3
7. Level Of Service	A	A	A	A
8. Delay Approach	7.0	7.2	7.0	6.3
9. LOS, approach	A	A	A	A
10. Delay, Intersection	6.9			

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst: LB
 2. Intersection: Woodley Rd. & Klinge Rd.
 3. Count Date:
 4. Time Period: Existing PM Peak

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	15	0	0
2. TH Volume:	3	0	5	0
3. RT Volume:	0	0	0	2
4. Peak Hour Factor:	0.75	0.60	0.50	0.50
5. Flow Rate LT:	0	25	0	0
6. Flow Rate TH:	4	0	10	0
7. Flow Rate RT:	0	0	0	4
8. Flow Rate Total:	4	25	10	4
9. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	25	10	4
2. Flow Rate LT:	0	25	0	0
3. Flow Rate RT:	0	0	0	4
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hHV-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.20	0.00	-0.60

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	25	10	4
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.02	0.01	0.00
4. hd, final value	4.0	4.1	4.0	3.4
5. x, final value	0.00	0.03	0.01	0.00
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	2.0	2.1	2.0	1.4

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	25	10	4
2. Service Time	2.0	2.1	2.0	1.4
3. Degree Utilization, x	0.00	0.03	0.01	0.00
4. Departure headway, hd	4.0	4.1	4.0	3.4
5. Capacity	507	868	901	1059
6. Delay	7.0	7.3	7.0	6.4
7. Level Of Service	A	A	A	A
8. Delay Approach	7.0	7.3	7.0	6.4
9. LOS, approach	A	A	A	A
10. Delay, Intersection	7.1			

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst: TR
 2. Intersection: Woodley Rd. & Klinge Rd.
 3. Count Date:
 4. Time Period: No Build AM Peak

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	1	0	0
2. TH Volume:	3	0	7	0
3. RT Volume:	0	0	0	2
4. Peak Hour Factor:	0.75	0.25	0.50	0.50
5. Flow Rate LT:	0	4	0	0
6. Flow Rate TH:	4	0	14	0
7. Flow Rate RT:	0	0	0	4
8. Flow Rate Total:	4	4	14	4
9. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	4	14	4
2. Flow Rate LT:	0	4	0	0
3. Flow Rate RT:	0	0	0	4
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hRV-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.20	0.00	-0.60

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	4	14	4
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.00	0.01	0.00
4. hd, final value	3.9	4.1	3.9	3.3
5. x, final value	0.00	0.00	0.02	0.00
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	1.9	2.1	1.9	1.3

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	4	14	4
2. Service Time	1.9	2.1	1.9	1.3
3. Degree Utilization, x	0.00	0.00	0.02	0.00
4. Departure headway, hd	3.9	4.1	3.9	3.3
5. Capacity	909	866	916	1078
6. Delay	7.0	7.2	7.0	6.3
7. Level Of Service	A	A	A	A
8. Delay Approach	7.0	7.2	7.0	6.3
9. LOS, approach	A	A	A	A
10. Delay, Intersection	6.9			

HCS: Unsignalized Intersections Release 3.1c

ALL-WAY STOP CONTROL (AWS) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst: LB
 2. Intersection: Woodley Rd. & Klinge Rd.
 3. Count Date:
 4. Time Period: No Build PM Peak

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	18	0	0
2. TH Volume:	3	0	6	0
3. RT Volume:	0	0	0	2
4. Peak Hour Factor:	0.75	0.60	0.50	0.50
5. Flow Rate LT:	0	30	0	0
6. Flow Rate TH:	4	0	12	0
7. Flow Rate RT:	0	0	0	4
8. Flow Rate Total:	4	30	12	4
9. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	30	12	4
2. Flow Rate LT:	0	30	0	0
3. Flow Rate RT:	0	0	0	4
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.00	0.00	0.00
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hRV-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.20	0.00	-0.60

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	30	12	4
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.03	0.01	0.00
4. hd, final value	4.0	4.1	4.0	3.4
5. x, final value	0.00	0.03	0.01	0.00
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	2.0	2.1	2.0	1.4

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	30	12	4
2. Service Time	2.0	2.1	2.0	1.4
3. Degree Utilization, x	0.00	0.03	0.01	0.00
4. Departure headway, hd	4.0	4.1	4.0	3.4
5. Capacity	904	867	898	1054
6. Delay	7.0	7.3	7.0	6.4
7. Level Of Service	A	A	A	A
8. Delay Approach	7.0	7.3	7.0	6.4
9. LOS, approach	A	A	A	A
10. Delay, Intersection	7.1			

11. LOS, Intersection

A

HCS: Unsignalized Intersections Release 3.1c

ALL WAY STOP CONTROL(AMSC) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst: LB
2. Intersection: Woodley Rd. & Klinge Rd.
3. Count Date:
4. Time Period: Build AM Peak

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	137	0	0
2. TR Volume:	3	0	7	0
3. RT Volume:	0	0	0	260
4. Peak Hour Factor:	0.75	0.80	0.50	0.80
5. Flow Rate LT:	0	171	0	0
6. Flow Rate TR:	4	0	14	0
7. Flow Rate RT:	0	0	0	325
8. Flow Rate Total:	4	171	14	325
9. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	171	14	325
2. Flow Rate LT:	0	171	0	0
3. Flow Rate RT:	0	0	0	325
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hSN-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.23	0.00	-0.57

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	171	14	325
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.15	0.01	0.29
4. hd, final value	4.8	4.8	4.6	3.8
5. x, final value	0.01	0.23	0.02	0.34
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	2.8	2.8	2.6	1.8

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	171	14	325
2. Service Time	2.8	2.8	2.6	1.8
3. Degree Utilization, x	0.01	0.23	0.02	0.34
4. Departure headway, hd	4.8	4.8	4.6	3.8
5. Capacity	707	716	744	927
6. Delay	7.8	9.2	7.7	8.7
7. Level Of Service	A	A	A	A
8. Delay Approach	7.8	9.2	7.7	8.7
9. LOS, approach	A	A	A	A
10. Delay, Intersection	8.9			

HCS: Unsignalized Intersections Release 3.1c

ALL-WAY STOP CONTROL (AMSC) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst: LB
 2. Intersection: Woodley Rd. & Klinge Rd.
 3. Count Date:
 4. Time Period: Build PM Peak

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	302	0	0
2. TH Volume:	3	0	6	0
3. RT Volume:	0	0	0	187
4. Peak Hour Factor:	0.75	0.85	0.50	0.80
5. Flow Rate LT:	0	355	0	0
6. Flow Rate TH:	4	0	12	0
7. Flow Rate RT:	0	0	0	233
8. Flow Rate Total:	4	355	12	233
9. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	355	12	233
2. Flow Rate LT:	0	355	0	0
3. Flow Rate RT:	0	0	0	233
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hMV-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.23	0.00	-0.57

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	355	12	233
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.32	0.01	0.21
4. hd, final value	4.8	4.7	5.0	4.2
5. x, final value	0.01	0.46	0.02	0.27
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	2.8	2.7	3.0	2.2

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	355	12	233
2. Service Time	2.8	2.7	3.0	2.2
3. Degree Utilization, x	0.01	0.46	0.02	0.27
4. Departure headway, hd	4.8	4.7	5.0	4.2
5. Capacity	704	751	665	813
6. Delay	7.9	11.6	8.1	6.8
7. Level Of Service	A	B	A	A
8. Delay Approach	7.9	11.6	8.1	6.8
9. LOS, approach	A	B	A	A
10. Delay, intersection	10.4			

HCS: Unsignalized Intersections Release 3.1c

ALL-WAY STOP CONTROL (AMSC) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst: LB
 2. Intersection: Woodley Rd. & Klingie Rd.
 3. Count Date:
 4. Time Period: Build AM Peak #2

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	205	0	0
2. TH Volume:	3	0	7	0
3. RT Volume:	0	0	0	348
4. Peak Hour Factor:	0.75	0.80	0.50	0.85
5. Flow Rate LT:	0	256	0	0
6. Flow Rate TH:	4	0	14	0
7. Flow Rate RT:	0	0	0	409
8. Flow Rate Total:	4	256	14	409
9. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	256	14	409
2. Flow Rate LT:	0	256	0	0
3. Flow Rate RT:	0	0	0	409
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hHV-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.23	0.00	-0.57

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	256	14	409
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.23	0.01	0.36
4. hd, final value	5.1	5.0	5.0	4.0
5. x, final value	0.01	0.36	0.02	0.46
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	3.1	3.0	3.0	2.0

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	256	14	409
2. Service Time	3.1	3.0	3.0	2.0
3. Degree Utilization, X	0.01	0.36	0.02	0.46
4. Departure headway, hd	5.1	5.0	5.0	4.0
5. Capacity	645	686	676	870
6. Delay	8.1	10.8	8.1	10.4
7. Level Of Service	A	B	A	B
8. Delay Approach	8.1	10.8	8.1	10.4
9. LOS, approach	A	B	A	B
10. Delay, Intersection	10.5			

HCS: Unsignalized Intersections Release 3.1c

ALL-WAY STOP CONTROL (AMSC) ANALYSIS

Worksheet 1 - Basic Intersection Information

1. Analyst: LB
 2. Intersection: Woodley Rd. & Klingie Rd.
 3. Count Date:
 4. Time Period: Build PM Peak #2

Worksheet 2 - Volume Adjustments and Site Characteristics

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. LT Volume:	0	401	0	0
2. TH Volume:	3	0	6	0
3. RT Volume:	0	0	0	248
4. Peak Hour Factor:	0.75	0.85	0.50	0.80
5. Flow Rate LT:	0	471	0	0
6. Flow Rate TH:	4	0	12	0
7. Flow Rate RT:	0	0	0	310
8. Flow Rate Total:	4	471	12	310
9. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
10. Subject Approach	1	1	1	1
11. Opposing Approach	1	1	1	1
12. Conflicting Approach	1	1	1	1
13. Geometry Group	1	1	1	1
14. T (Time in Hours):	0.250			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Flow Rate Total:	4	471	12	310
2. Flow Rate LT:	0	471	0	0
3. Flow Rate RT:	0	0	0	310
4. Prop LT in lane:	0.00	1.00	0.00	0.00
5. Prop RT in lane:	0.00	0.00	0.00	1.00
6. Prop. Heavy Vehicle:	0.00	0.02	0.00	0.02
7. Geometry Group	1	1	1	1
8. hLT-adj by Table 10-18	0.20	0.20	0.20	0.20
9. hRT-adj by Table 10-18	-0.60	-0.60	-0.60	-0.60
10. hHV-adj Table 10-18	1.70	1.70	1.70	1.70
11. hadj	0.00	0.23	0.00	-0.57

Worksheet 4 - Departure Headway and Service Time

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	471	12	310
2. hd, initial value	3.2	3.2	3.2	3.2
3. x, initial	0.00	0.42	0.01	0.28
4. hd, final value	5.2	4.9	5.5	4.5
5. x, final value	0.01	0.64	0.02	0.39
6. Move-up time, m	2.0	2.0	2.0	2.0
7. Service Time	3.2	2.9	3.5	2.5

Worksheet 5 - Capacity and Level of Service

	North Bound	South Bound	East Bound	West Bound
	L1	L1	L1	L1
1. Total lane flow rate	4	471	12	310
2. Service Time	3.2	2.9	3.5	2.5
3. Degree Utilization, x	0.01	0.64	0.02	0.39
4. Departure headway, hd	5.2	4.9	5.5	4.5
5. Capacity	636	722	599	755
6. Delay	8.3	16.2	8.6	10.4
7. Level Of Service	A	C	A	B
8. Delay Approach	8.3	16.2	8.6	10.4
9. LOS, approach	A	C	A	B
10. Delay, Intersection	13.8			

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: Existing AM Peak Hour
 E/W St: Cleveland Ave. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	612	16	117	90	4	6	4	0	17	7	21
Lane Width	16.0			11.0 11.0			15.0			12.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green		36.0	21.0			15.0		
Yellow		4.0	4.0			4.0		
All Red		2.0	2.0			2.0		
Cycle Length:	90.0 secs							

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
			v/c	g/C	Delay LOS	Delay LOS	
Eastbound							
LTR	656	1640	1.06	0.400	80.4 F	80.4 F	
Westbound							
L	133	332	1.10	0.400	133.7 F		
TR	715	1788	0.16	0.400	17.8 B	82.1 F	
Northbound							
LTR	290	1741	0.06	0.167	32.0 C	32.0 C	
Southbound							
LTR	228	1369	0.33	0.167	36.9 D	36.9 D	

Intersection Delay = 76.9 (sec/veh) Intersection LOS = E

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
Analyst: LB Proj #:
Date: 8/24/00 Period: Existing PM Peak Hour
E/W St: Cleveland Ave. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	161	9	249	171	1	3	2	1	8	3	8
Lane Width	16.0			11.0	11.0		15.0			12.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4	Phase Combination		5	6	7	8
EB	Left	P				NB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X		X			Peds				
WB	Left	P				SB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X		X			Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		36.0	21.0					15.0			
Yellow		4.0	4.0					4.0			
All Red		2.0	2.0					2.0			
Cycle Length: 90.0		secs									

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LTR	654	1634	0.32	0.400	19.9	B	19.9	B
Westbound								
L	397	993	0.78	0.400	37.9	D		
TR	720	1799	0.30	0.400	19.5	B	30.4	C
Northbound								
LTR	267	1604	0.05	0.167	31.9	C	31.9	C
Southbound								
LTR	233	1398	0.13	0.167	33.1	C	33.1	C
Intersection Delay = 27.7 (sec/veh) Intersection LOS = C								

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
Analyst: LB Proj #: -
Date: 8/24/00 Period: 2017 No Build AM Peak Hour
E/W St: Cleveland Ave. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig		LTR		L	TR			LTR			LTR	
Volume	0	722	19	138	106	5	7	5	0	20	8	25
Lane Width		16.0		11.0	11.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration	0.25	Area Type: All other areas
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Signal Operations

Phase Combination		1	2	3	4	Signal Operations		5	6	7	8
EB	Left	P				NB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X		X			Peds	X			
WB	Left	P				SB	Left	P			
	Thru	P					Thru	P			
	Right	P					Right	P			
	Peds	X		X			Peds	X			
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		36.0	21.0					15.0			
Yellow		4.0	4.0					4.0			
All Red		2.0	2.0					2.0			
Cycle Length: 90.0		secs									

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LTR	656	1641	1.25	0.400	153.8	F	153.8	F
Westbound								
L	94	235	1.83	0.400	438.7	F		
TR	715	1788	0.19	0.400	18.2	B	251.5	F
Northbound								
LTR	287	1722	0.08	0.167	32.2	C	32.2	C
Southbound								
LTR	226	1356	0.39	0.167	38.4	D	38.4	D
Intersection Delay = 167.8 (sec/veh) Intersection LOS = F								

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 No Build PM Peak Hour
 E/W St: Cleveland Ave. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	190	9	294	202	1	3	2	1	9	3	10
Lane Width	16.0			11.0 11.0			15.0			12.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations										
Phase Combination		1	2	3	4		5	6	7	8
EB	Left	P				NB	Left	P		
	Thru	P					Thru	P		
	Right	P					Right	P		
	Peds	X	X				Peds			
WB	Left	P				SB	Left	P		
	Thru	P					Thru	P		
	Right	P					Right	P		
	Peds	X	X				Peds			
NB	Right					EB	Right			
SB	Right					WB	Right			
Green		36.0	21.0				15.0			
Yellow		4.0	4.0				4.0			
All Red		2.0	2.0				2.0			
Cycle Length: 90.0		secs								

Intersection Performance Summary

Appr/Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
	Capacity		v/c	g/C	Delay	LOS	Delay	LOS

Eastbound

LTR 654 1636 0.38 0.400 20.8 C 20.8 C

Westbound

L 369 922 0.99 0.400 72.4 E
TR 720 1800 0.35 0.400 20.2 C 51.1 D

Northbound

LTR 267 1602 0.05 0.167 31.9 C 31.9 C

Southbound

LTR 231 1388 0.16 0.167 33.6 C 33.6 C

Intersection Delay = 41.9 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Build AM Peak Hour
 E/W St: Cleveland Ave. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	686	19	138	73	5	7	5	0	20	8	25
Lane Width	16.0			11.0 11.0			15.0			12.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations									
Phase Combination		1	2	3	4	5	6	7	8
EB	Left	P				NB	Left	P	
	Thru	P				Thru	P		
	Right	P				Right	P		
	Peds	X	X			Peds	X		
WB	Left	P				SB	Left	P	
	Thru	P			Thru		P		
	Right	P			Right		P		
	Peds	X	X		Peds		X		
NB	Right					EB	Right		
SB	Right					WB	Right		
Green		36.0	21.0				15.0		
Yellow		4.0	4.0				4.0		
All Red		2.0	2.0				2.0		
Cycle Length:		90.0	secs						

Intersection Performance Summary

Appr/Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
	Capacity		v/c	g/C	Delay	LOS	Delay	LOS

Eastbound

LTR 656 1640 1.19 0.400 128.6 F 128.6 F

Westbound

L 106 264 1.62 0.400 346.1 F
TR 713 1783 0.14 0.400 17.5 B 227.6 F

Northbound

LTR 287 1722 0.08 0.167 32.2 C 32.2 C

Southbound

LTR 226 1356 0.39 0.167 38.4 D 38.4 D

Intersection Delay = 142.9 (sec/veh) Intersection LOS = F

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
Analyst: LB Proj #:
Date: 8/24/00 Period: 2017 Build PM Peak Hour
E/W St: Cleveland Ave. N/S St: 32nd St.

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	159	9	294	163	1	3	2	1	9	3	10
Lane Width	16.0			11.0	11.0		15.0			12.0		
RTOR Vol		0			0			0			0	

Duration	0.25	Area Type: All other areas							
Phase Combination	1	2	3	4	5	6	7	8	
EB Left	P				NB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds				
WB Left	P				SB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	36.0	21.0				15.0			
Yellow	4.0	4.0				4.0			
All Red	2.0	2.0				2.0			
Cycle Length:	90.0	secs							

[illegible]

Intersection Delay = 35.8 (sec/veh) Intersection LOS = D

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
Analyst: LB Proj #:
Date: 8/24/00 Period: 2017 Build AM Peak w Mitigat
E/W St: Cleveland Ave. N/S St: 32nd St.

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	674	19	138	61	5	7	5	0	20	8	25
Lane Width	16.0			11.0 11.0			15.0			12.0		
RTOR Vol	0			0			0			0		

Duration	0.25	Area Type: All other areas							
Phase Combination	1	2	3	4	5	6	7	8	
EB Left	P				NB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds	X			
WB Left	P				SB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds	X			
NB Right					EB Right				
SB Right					WB Right				
Green	36.0	21.0				15.0			
Yellow	4.0	4.0				4.0			
All Red	2.0	2.0				2.0			
Cycle Length:	90.0	secs							

Intersection Performance Summary						
Appr/ Lane	Lane Group	Adj Flow	Sat Rate	Ratios		Lane Group Approach
Grp	Capacity	(s)		\bar{v}/c	g/C	Delay LOS Delay LOS

Intersection Delay = 136.3 (sec/veh) Intersection LOS = F

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
Analyst: LE Proj #:
Date: 8/24/00 Period: 2017 Build PM Peak Hour
E/W St: Cleveland Ave. N/S St: 32nd St.

Duration	0.25	Area Type: All other areas							
Phase Combination	1	2	3	4	5	6	7	8	
EB Left	P				NB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds				
WB Left	P				SB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	36.0	21.0				15.0			
Yellow	4.0	4.0				4.0			
All Red	2.0	2.0				2.0			
Cycle Length:	90.0	secs							

Approach		Intersection Performance Summary				Lane Group		Approach	
Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach		
			v/c	g/C	Delay	LOS	Delay	LOS	
Eastbound									
LTR	653	1632	0.30	0.400	19.6	B	19.6	B	
Westbound									
L	411	1027	0.89	0.400	49.5	D			
TR	720	1799	0.26	0.400	19.0	B	39.2	D	
Northbound									
LTR	267	1602	0.05	0.167	31.9	C	31.9	C	
Southbound									
LTR	231	1388	0.16	0.167	33.6	C	33.6	C	
Intersection Delay = 34.0 (sec/veh) Intersection LOS = C									

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
Analyst: LB Proj #:
Date: 8/24/00 Period: Existing AM Peak Hour
E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

	SIGNALIZED INTERSECTION SUMMARY											
	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR			LTR			LTR	
Volume	29		275	5	89	27	6	4	0	17	7	21
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0			0			0			0

Duration	0.25	Area Type: All other areas							
Phase Combination	1	2	3	4	5	6	7	8	
EB Left	P				NB Left	P			
Thru					Thru	P			
Right	P				Right				
Peds	X	X			Peds				
WB Left	P				SB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	21.0	36.0				15.0			
Yellow	4.0	4.0				4.0			
All Red	2.0	2.0				2.0			
Cycle Length:	90.0	secs							

Approach		Intersection Performance Summary						
Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	123	529	0.29	0.233	34.3	C	51.0	D
R	365	1566	0.84	0.233	52.9	D		
Westbound								
LTR	389	1666	0.39	0.233	32.1	C	32.1	C
Northbound								
LTR	282	1689	0.06	0.167	32.0	C	32.0	C
Southbound								
LTR	228	1369	0.33	0.167	36.9	D	36.9	D
Intersection Delay = 43.7 (sec/veh) Intersection LOS = D								

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: Existing PM Peak Hour
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR			LTR			LTR	
Volume	11		255	7	49	15	3	2	1	8	3	8
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0		0			0			0	

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru					Thru	P		
Right	P				Right	P		
Peds	X	X			Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X	X			Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	21.0	36.0			15.0			
Yellow	4.0	4.0			4.0			
All Red	2.0	2.0			2.0			
Cycle Length:	90.0	secs						

Intersection Performance Summary

Appr/Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	162	694	0.10	0.233	28.3	C	46.1	D
R	365	1566	0.78	0.233	47.1	D		
Westbound								
LTR	389	1666	0.26	0.233	29.8	C	29.8	C
Northbound								
LTR	260	1561	0.05	0.167	31.9	C	31.9	C
Southbound								
LTR	233	1398	0.13	0.167	33.1	C	33.1	C

Intersection Delay = 41.0 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 No Build AM Peak Hour
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR			LTR			LTR	
Volume	34		325	5	106	32	7	5	0	20	8	25
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0		0			0			0	

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru					Thru	P		
Right	P				Right	P		
Peds	X	X			Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X	X			Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	21.0	36.0			15.0			
Yellow	4.0	4.0			4.0			
All Red	2.0	2.0			2.0			
Cycle Length:	90.0	secs						

Intersection Performance Summary

Appr/Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	105	450	0.40	0.233	40.2	D	74.8	E
R	365	1566	0.99	0.233	78.8	E		
Westbound								
LTR	389	1667	0.46	0.233	33.6	C	33.6	C
Northbound								
LTR	278	1670	0.08	0.167	32.2	C	32.2	C
Southbound								
LTR	226	1356	0.39	0.167	38.4	D	38.4	D

Intersection Delay = 58.1 (sec/veh) Intersection LOS = E

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 No Build PM Peak Hour
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR		LTR			LTR		
Volume	13		301	8	58	18	3	2	1	9	3	10
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0			0			0			0

Duration	0.25	Area Type: All other areas							
		Signal Operations							
Phase Combination	1	2	3	4	5	6	7	8	
EB Left	P				NB Left	P			
Thru					Thru	P			
Right	P				Right				
Peds	X	X			Peds				
WB Left	P				SB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	21.0	36.0				15.0			
Yellow	4.0	4.0				4.0			
All Red	2.0	2.0				2.0			
Cycle Length:	90.0	secs							

Appr/ Lane Grp		Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
				v/c	g/C	Delay	LOS	Delay	LOS
Eastbound									
L	147	628	0.13	0.233	29.1	C		61.6	E
R	365	1566	0.92	0.233	63.5	E			
Westbound									
LTR	388	1664	0.31	0.233	30.7	C	30.7	C	
Northbound									
LTR	260	1558	0.05	0.167	31.9	C	31.9	C	
Southbound									
LTR	231	1388	0.16	0.167	33.6	C	33.6	C	

Intersection Delay = 51.7 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Build AM Peak Hour
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR		LTR			LTR		
Volume	34		320	5	96	32	7	5	0	20	8	25
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0			0			0			0

Duration	0.25	Area Type: All other areas							
		Signal Operations							
Phase Combination	1	2	3	4	5	6	7	8	
EB Left	P				NB Left	P			
Thru					Thru	P			
Right	P				Right				
Peds	X	X			Peds				
WB Left	P				SB Left	P			
Thru	P				Thru	P			
Right	P				Right	P			
Peds	X	X			Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	21.0	36.0				15.0			
Yellow	4.0	4.0				4.0			
All Red	2.0	2.0				2.0			
Cycle Length:	90.0	secs							

Intersection Performance Summary								
Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	113	484	0.37	0.233	38.1	D	71.6	E
R	365	1566	0.98	0.233	75.5	E		
Westbound								
LTR	388	1662	0.43	0.233	32.9	C	32.9	C
Northbound								
LTR	278	1670	0.08	0.167	32.2	C	32.2	C
Southbound								
LTR	226	1356	0.39	0.167	38.4	D	38.4	D

Intersection Delay = 56.4 (sec/veh) Intersection LOS = E

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Build PM Peak Hour
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR		LTR				LTR	
Volume	13		287	8	51	18	3	2	1	9	3	10
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0			0			0			0

Duration	0.25		Area Type: All other areas									
Signal Operations												
Phase Combination	1	2	3	4		5	6	7	8			
EB Left	P				NB Left	P						
Thru					Thru	P						
Right	P				Right	P						
Peds	X		X		Peds	P						
WB Left	P				SB Left	P						
Thru	P				Thru	P						
Right	P				Right	P						
Peds	X		X		Peds	P						
NB Right					EB Right							
SB Right					WB Right							
Green	21.0	36.0				15.0						
Yellow	4.0	4.0				4.0						
All Red	2.0	2.0				2.0						
Cycle Length:	90.0	secs										

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	154	662	0.12	0.233	28.9	C	55.7	E
R	365	1566	0.87	0.233	57.2	E		
Westbound								
LTR	387	1658	0.29	0.233	30.2	C	30.2	C
Northbound								
LTR	260	1558	0.05	0.167	31.9	C	31.9	C
Southbound								
LTR	231	1388	0.16	0.167	33.6	C	33.6	C

Intersection Delay = 47.7 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Build AM Peak w Mitigatio
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR		LTR				LTR	
Volume	34		318	5	92	32	7	5	0	20	8	25
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0			0			0			0

Duration	0.25	Area Type: All other areas										
Signal Operations												
Phase Combination	1	2	3	4		5	6	7	8			
EB Left	P				NB Left	P						
Thru					Thru	P						
Right	P				Right	P						
Peds	X	X			Peds	P						
WB Left	P				SB Left	P						
Thru	P				Thru	P						
Right	P				Right	P						
Peds	X	X			Peds	P						
NB Right					EB Right							
SB Right					WB Right							
Green	21.0	36.0				15.0						
Yellow	4.0	4.0				4.0						
All Red	2.0	2.0				2.0						
Cycle Length:	90.0	secs										

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	116	499	0.36	0.233	37.4	D	69.8	E
R	365	1566	0.97	0.233	73.7	E		
Westbound								
LTR	387	1660	0.42	0.233	32.7	C	32.7	C
Northbound								
LTR	278	1670	0.08	0.167	32.2	C	32.2	C
Southbound								
LTR	226	1356	0.39	0.167	38.4	D	38.4	D

Intersection Delay = 55.4 (sec/veh) Intersection LOS = E

HCS: Signalized Intersections Release 3.1c

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Build PM Peak w Mitigatio
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR		LTR			LTR		
Volume	13		282	8	48	18	3	2	1	9	3	10
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0		0			0			0	

Duration	0.25		Area Type: All other areas							
Signal Operations										
Phase Combination	1	2	3	4	5	6	7	8		
EB Left	P				NB Left	P				
Thru					Thru	P				
Right	P				Right	P				
Peds	X	X			Peds					
WB Left	P				SB Left	P				
Thru	P				Thru	P				
Right	P				Right	P				
Peds	X	X	1		Peds					
NB Right					EB Right					
SB Right					WB Right					
Green	21.0	36.0				15.0				
Yellow	4.0	4.0				4.0				
All Red	2.0	2.0				2.0				
Cycle Length:	90.0		secs							

Intersection Performance Summary							
Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach
			v/c	g/C	Delay	LOS	Delay LOS
Eastbound							
L	158	676	0.12	0.233	28.8	C	53.6 D
R	365	1566	0.86	0.233	55.1	E	
Westbound							
LTR	386	1655	0.28	0.233	30.1	C	30.1 C
Northbound							
LTR	260	1558	0.05	0.167	31.9	C	31.9 C
Southbound							
LTR	231	1388	0.16	0.167	33.6	C	33.6 C

Intersection Delay = 46.4 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.2

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: 2017 Scenario 3 AM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	2	0	0	4	0
LGConfig		LTR		L	T	R		LTR			LTR	
Volume	17	486	57	140	343	270	0	657	90	270	2893	38
Lane Width		12.0		10.0	10.0	10.0		10.0			10.0	
RTOR Vol		0			0			0			0	

Duration	0.25		Area Type: All other areas									
Signal Operations												
Phase Combination	1	2	3	4	5	6	7	8				
EB Left	P				NB Left	P						
Thru	P				Thru	P						
Right	P				Right	P						
Peds	X				Peds	X						
WB Left	P				SB Left	P						
Thru	P				Thru	P	P					
Right	P				Right	P	P					
Peds	X				Peds	X	X					
NB Right					EB Right							
SB Right					WB Right							
Green	26.0					27.0	27.0					
Yellow	4.0						4.0					
All Red	1.0					0.0	1.0					
Cycle Length:	90.0	secs										

Intersection Performance Summary							
Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach
			v/c	g/C	Delay	LOS	Delay LOS
Eastbound							
LTR	374	1295	1.78	0.289	395.2	F	395.2 F
Westbound							
L	80	265	2.50	0.289	742.6	F	
T	497	1722	0.77	0.289	40.0	D	199.1 F
R	418	1447	0.72	0.289	38.8	D	
Northbound							
LTR	967	3224	0.89	0.300	42.0	D	42.0 D
Southbound							
LTR	3698	6164	0.92	0.600	20.9	C	20.9 C

Intersection Delay = 94.1 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.2

Inter: Connecticut Ave. & Porter St. City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/23/00 Period: 2017 Scenario 3 PM Peak Hour
 E/W St: Porter St. N/S St: Connecticut Ave.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	1	0	4	0	0	2	0
LGConfig	LTR			L T R			LTR			LTR		
Volume	32	411	26	118	369	98	14	1610	117	14	618	32
Lane Width	12.0			10.0 10.0 10.0			10.0			10.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Phase Combination				Signal Operations							
	1	2	3	4		5	6	7	8		
EB Left	P				NB Left		P				
Thru	P				Thru		P				
Right	P				Right		P				
Peds	X				Peds		X				
WB Left	P				SB Left	P					
Thru	P				Thru	P	P				
Right	P				Right	P	P				
Peds	X				Peds	X	X				
NB Right					EB Right						
SB Right					WB Right						
Green	25.0					16.0	39.0				
Yellow	4.0						4.0				
All Red	1.0					0.0	1.0				
Cycle Length: 90.0 secs											

Intersection Performance Summary

Appr/Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
			v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 286 1031 1.95 0.278 473.0 F 473.0 F

Westbound

L 80 275 1.77 0.278 426.8 F
 T 478 1722 0.76 0.278 40.7 D 125.2 F
 R 402 1447 0.31 0.278 27.7 C

Northbound

LTR 2497 5763 0.78 0.433 24.3 C 24.3 C

Southbound

LTR 1997 3268 0.36 0.611 9.2 A 9.2 A

Intersection Delay = 103.2 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.2

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Scenario 3 AM Peak Hour
 E/W St: Cleveland Ave. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	722	19	138	73	5	7	5	0	20	8	25
Lane Width	16.0			11.0 11.0			15.0			12.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations								
Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X	X			Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X	X			Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	36.0	21.0			15.0			
Yellow	4.0	4.0			4.0			
All Red	2.0	2.0			2.0			
Cycle Length:	90.0	secs						

Intersection Performance Summary

Appr/Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
			v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 656 1640 1.25 0.400 153.8 F 153.8 F

Westbound

L 94 235 1.83 0.400 438.7 F
 TR 713 1793 0.14 0.400 17.5 B 286.8 F

Northbound

LTR 287 1722 0.08 0.167 32.2 C 32.2 C

Southbound

LTR 226 1356 0.39 0.167 38.4 D 38.4 D

Intersection Delay = 172.9 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.2

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Scenario 3 PM Peak Hour
 E/W St: Cleveland Ave. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	1	1	0	0	1	0	0	1	0
LGConfig	LTR			L TR			LTR			LTR		
Volume	0	159	9	294	202	1	3	2	1	9	3	10
Lane Width	16.0			11.0 11.0			15.0			12.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X	X			Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X	X			Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	36.0	21.0				15.0		
Yellow	4.0	4.0				4.0		
All Red	2.0	2.0				2.0		
Cycle Length:	90.0	secs						

Intersection Performance Summary

Appr/ Lane	Lane	Adj Sat	Ratios		Lane Group	Approach	
Grp	Capacity	Flow Rate (s)	v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 653 1632 0.32 0.400 19.9 B 19.9 B

Westbound

L 399 997 0.92 0.400 54.4 D
TR 720 1800 0.35 0.400 20.2 C 40.5 D

Northbound

LTR 269 1611 0.05 0.167 31.8 C 31.8 C

Southbound

LTR 231 1388 0.16 0.167 33.6 C 33.6 C

Intersection Delay = 35.1 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.2

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Scenario 3 AM Peak Hour
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L R			LTR			LTR			LTR		
Volume	34		325	5	96	32	7	5	0	20	8	25
Lane Width	12.0			13.0			14.0			12.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination				Signal Operations				
	1	2	3	4	5	6	7	8
EB	Left	P			NB	Left	P	
	Thru					Thru	P	
	Right	P				Right		
	Peds	X	X			Peds		
WB	Left	P			SB	Left	P	
	Thru	P				Thru	P	
	Right	P				Right	P	
	Peds	X	X			Peds		
NB	Right				EB	Right		
SB	Right				WB	Right		
Green		21.0	36.0			15.0		
Yellow		4.0	4.0			4.0		
All Red		2.0	2.0			2.0		
Cycle Length: 90.0		secs						

Intersection Performance Summary

Appr/ Lane	Lane	Adj Sat	Ratios		Lane Group	Approach	
Grp	Capacity	Flow Rate (s)	v/c	g/C	Delay LOS	Delay LOS	

Eastbound

L 113 484 0.37 0.233 38.1 D 74.6 E

Westbound

R 365 1566 0.99 0.233 78.8 E

Northbound

LTR 388 1662 0.43 0.233 32.9 C 32.9 C

Southbound

LTR 278 1670 0.08 0.167 32.2 C 32.2 C

Southbound

LTR 226 1356 0.39 0.167 38.4 D 38.4 D

Intersection Delay = 58.3 (sec/veh) Intersection LOS = E

HCS: Signalized Intersections Release 3.2

Inter: Cleveland Ave. & Garfield St. City/St: Washington D.C.
 Analyst: LB Proj #:
 Date: 8/24/00 Period: 2017 Scenario 3 PM Peak Hour
 E/W St: Garfield St./Woodley Rd. N/S St: 32nd St.

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	0	1	0	1	0	0	1	0	0	1	0
LGConfig	L		R		LTR			LTR			LTR	
Volume	13		287	8	58	18	3	2	1	9	3	10
Lane Width	12.0		12.0		13.0			14.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru					Thru	P		
Right	P				Right			
Peds	X	X			Peds			
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X	X			Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	21.0	36.0				15.0		
Yellow	4.0	4.0				4.0		
All Red	2.0	2.0				2.0		
Cycle Length:	90.0	secs						

Intersection Performance Summary

Appr/Lane	Lane	Adj Sat	Ratios		Lane Group	Approach	
Grp	Capacity	Flow Rate (s)	v/c	g/C	Delay LOS	Delay LOS	
Eastbound							
L	147	628	0.13	0.233	29.1 C		
R	365	1566	0.87	0.233	57.2 E	55.7 E	
Westbound							
LTR	388	1664	0.31	0.233	30.7 C	30.7 C	
Northbound							
LTR	261	1568	0.05	0.167	31.9 C	31.9 C	
Southbound							
LTR	231	1388	0.16	0.167	33.6 C	33.6 C	

Intersection Delay = 47.5 (sec/veh) Intersection LOS = D

HCS: Signalized Intersections Release 3.2

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 Scenario 3 AM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig		LTR			LTR			LTR			TR	
Volume	14	20	307	1	258	0	34	543	2		1126	21
Lane Width		14.0			10.0			10.0			13.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right			
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right			
Peds	X				Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	19.0					59.0		
Yellow	4.0					4.0		
All Red	2.0					2.0		
Cycle Length:	90.0	secs						

Intersection Performance Summary

Appr/Lane	Lane	Adj Sat	Ratios		Lane Group	Approach	
Grp	Capacity	Flow Rate (s)	v/c	g/C	Delay LOS	Delay LOS	
Eastbound							
LTR	275	1304	1.53	0.211	293.6 F	293.6 F	
Westbound							
LTR	369	1748	0.79	0.211	49.2 D	49.2 D	
Northbound							
LTR	1318	2011	0.50	0.656	9.3 A	9.3 A	
Southbound							
TR	1111	1695	1.09	0.656	69.5 E	69.5 E	

Intersection Delay = 88.6 (sec/veh) Intersection LOS = F

HCS: Signalized Intersections Release 3.2

Inter: 34th Street & Woodley Road City/St: Washington D.C.
 Analyst: LB Proj #: JA-2249
 Date: 8/17/00 Period: 2017 Scenario 3 PM Peak Hour
 E/W St: Woodley Road N/S St: 34th Street

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	2	0	0	1	0
LGConfig	LTR			LTR			LTR			TR		
Volume	35	305	82	1	0	0	215	1049	7	224	0	0
Lane Width	14.0			10.0			10.0			13.0		
RTOR Vol	0			0			0			0		

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
WB Left	P				SB Left	P		
Thru	P				Thru	P		
Right	P				Right	P		
Peds	X				Peds	X		
NB Right					EB Right			
SB Right					WB Right			
Green	25.0				53.0			
Yellow	4.0				4.0			
All Red	2.0				2.0			

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group	Approach	
	Capacity		v/c	g/C	Delay LOS	Delay LOS	

Eastbound

LTR 448 1613 1.13 0.278 116.2 F 116.2 F

Westbound

LTR 383 1378 0.01 0.278 23.6 C 23.6 C

Northbound

LTR 1577 2678 0.87 0.589 22.1 C 22.1 C

Southbound

TR 1134 1925 0.21 0.589 9.1 A 9.1 A

Intersection Delay = 43.3 (sec/veh) Intersection LOS = D

HCS: Unsignalized Intersections Release 3.2

TWO-WAY STOP CONTROL SUMMARY

Intersection: Woodley Rd. & 32nd St.
 Analyst: lb
 Project No.:
 Date:
 East/West Street:
 North/South Street:
 Intersection Orientation: EW

Study period (hrs): 0.25

		Vehicle Volumes and Adjustments					
Major Street:	Approach Movement	Eastbound			Westbound		
		1 L	2 T	3 R	4 L	5 T	6 R
Volume			1	84	0	263	
Hourly Flow Rate, HFR			4	139	0	328	
Percent Heavy Vehicles			--	--	0	--	--
Median Type	Undivided						
RT Channelized?							
Lanes		1	0		0	1	
Configuration			TR		LT		
Upstream Signal?	No				No		

Minor Street:	Approach Movement	Northbound			Southbound		
		7 L	8 T	9 R	10 L	11 T	12 R
Volume		2		0			
Hourly Flow Rate, HFR		4		0			
Percent Heavy Vehicles		0		0			
Percent Grade (%)			0			0	
Median Storage	1						
Flared Approach:	Exists?		No				
	Storage						
RT Channelized?							
Lanes		0		0			
Configuration			LR				

		Delay, Queue Length, and Level of Service							
Approach Movement	EB 1	Northbound			Southbound			10	11
		WB 4 LT	7	8 LR	9	12			
v (vph)		0		4					
C(m) (vph)		1452		608					
v/c		0.00		0.01					
95% queue length		0.00		0.00					
Control Delay		7.5		11.0					
LOS		A		B					
Approach Delay				11.0					
Approach LOS				B					

HCS: Unsignalized Intersections Release 3.2

TWO-WAY STOP CONTROL SUMMARY

Intersection: Woodley Rd. & 32nd St.
 Analyst: lb
 Project No.: 55 Pm
 Date:
 East/West Street:
 North/South Street:
 Intersection Orientation: EW
 Study period (hrs): 0.25

Major Street: Approach Movement		Eastbound			Westbound		
		L	T	R	L	T	R
Volume		302	41	0	5		
Hourly Flow Rate, HFR		377	68	0	9		
Percent Heavy Vehicles		--	--	0	--	--	
Median Type	Undivided						
RT Channelized?							
Lanes		1	0		0	1	
Configuration			TR			LT	
Upstream Signal?		No			No		

Minor Street: Approach Movement		Northbound			Southbound		
		L	T	R	L	T	R
Volume		2		0			
Hourly Flow Rate, HFR		4		0			
Percent Heavy Vehicles		0		0			
Percent Grade (%)			0			0	
Median Storage							
Flared Approach: Exists?	No						
Storage							
RT Channelized?							
Lanes		0		0			
Configuration			LR				

Approach Movement		Delay, Queue Length, and Level of Service					
		EB	WB	Northbound	Southbound		
Lane Config		1	4	7	8	9	10 11 12
			LT		LR		
v (vph)		0		4			
C(m) (vph)		1126		594			
v/c		0.00		0.01			
95% queue length		0.00		0.00			
Control Delay		8.2		11.1			
LOS		A		B			
Approach Delay				11.1			
Approach LOS				B			

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Intersection: Woodley Rd. & Klinge Rd.
 City/State:
 Analyst: LB
 Project No.:
 Time period Analyzed: Scenario 3 AM Peak
 Date:
 East/West Street:
 North/South Street:

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	7	0	0	0	260	0	3	0	1	0	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	T		R		T		L	
PHF	0.50		0.80		0.75		0.25	
Flow Rate	14		324		4		4	
% Heavy Veh	0		0		0		0	
No. Lanes		1		1		1		1
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	14		324		4		4	
Left-Turn	0		0		0		4	
Right-Turn	0		324		0		0	
Prop. Left-Turns	0.0		0.0		0.0		1.0	
Prop. Right-Turns	0.0		1.0		0.0		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Table 10-40:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	

hHV-adj 1.7 1.7 1.7 1.7
 hdj, computed 0.0 -0.6 0.0 0.2

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	14		324		4		4	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.01		0.29		0.00		0.00	
hd, final value	4.16		3.33		4.49		4.69	
x, final value	0.02		0.30		0.00		0.01	
Move-up time, m	2.0		2.0		2.0		2.0	
Service Time	2.2		1.3		2.5		2.7	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	14		324		4		4	
Service Time	2.2		1.3		2.5		2.7	
Utilization, x	0.02		0.30		0.00		0.01	
Dep. headway, hd	4.16		3.33		4.49		4.69	
Capacity	264		574		254		254	
Delay	7.23		7.75		7.51		7.71	
LOS	A		A		A		A	
Approach:								
Delay	7.23		7.75		7.51		7.71	
LOS	A		A		A		A	
Intersection Delay	7.73							
Intersection LOS			A					

HCS: Unsignalized Intersections Release 3.2

Phone:
 E-Mail:

Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Intersection: Woodley Rd. & Klinge Rd.
 City/State:
 Analyst: LB
 Project No.:
 Time period Analyzed: Scenario 3 PM Peak
 Date:
 East/West Street:
 North/South Street:

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	0	6	0	0	0	2	0	3	0	302	0	0
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	T		R		T		L	
PHF	0.50		0.50		0.75		0.80	
Flow Rate	12		4		4		377	
% Heavy Veh	0		0		0		0	
No. Lanes	1		1		1		1	
Opposing-Lanes	1		1		1		1	
Conflicting-lanes	1		1		1		1	
Geometry group	1		1		1		1	
Duration, T	0.25		hrs.					

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	12		4		4		377	
Left-Turn	0		0		0		377	
Right-Turn	0		4		0		0	
Prop. Left-Turns	0.0		0.0		0.0		1.0	
Prop. Right-Turns	0.0		1.0		0.0		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
Geometry Group	1		1		1		1	
Adjustments Table 10-40:								
hLT-adj	0.2		0.2		0.2		0.2	
hRT-adj	-0.6		-0.6		-0.6		-0.6	

**Transportation
Study
D-3: Tables and
Figures**

TABLE 1
TRIP SHARE PERCENTAGE CALCULATION (BASED ON 2000 TRAFFIC VOLUMES)

	AM Peak Period (7:00 - 9:30)				PM Peak Period (4:00 – 6:30)			
	EASTBOUND		WESTBOUND		EASTBOUND		WESTBOUND	
Roadways	Volume	Weight	Volume	Weight	Volume	Weight	Volume	Weight
Porter Street	1687	1	1687	1	2033	1	1901	1
Cleveland Avenue	1325	0.5	546	0.5	557	0.5	1125	0.5
Woodley Road	167	0.5	167	0.5	245	0.5	221	0.5
Cathedral Avenue	167	0.5	167	0.5	245	0.5	221	0.5
South Alternatives Subtotal	1659		880		1047		1567	
Weighed South Alternatives Total	830		440		524		784	
Weighed Total	2517		2127		2557		2685	
	Trip Share Percentage							
Porter Street	67%		79%		80%		71%	
Cleveland Avenue	26%		13%		11%		21%	
Woodley Road	4%		4%		5%		4%	
Cathedral Avenue	3%		4%		4%		4%	

TABLE 2
TRAFFIC DIVERSION FOR SCENARIO 1: KLING ROAD REOPENS WITH PREVIOUS ROAD CONDITION

	AM Peak Hour		PM Peak Hour	
	EASTBOUND	WESTBOUND	EASTBOUND	WESTBOUND
Peak Hour Volumes on Kling Road	136	258	284	184
Diverted from Porter Street	91	205	226	130
Diverted from Cleveland Avenue	36	33	31	39
Diverted from Woodley Road	5	10	14	7
Diverted from Cathedral Avenue	4	10	13	7

TABLE 3
**TRAFFIC DIVERSION FOR SCENARIO 2: KLING ROAD REOPENS
WITH IMPROVEMENT OF 10MPH SPEED INCREASE**

	AM Peak Hour		PM Peak Hour	
	EASTBOUND	WESTBOUND	EASTBOUND	WESTBOUND
Peak Hour Volumes on Kling Road	184	348	383	248
Diverted from Porter Street	123	276	305	176
Diverted from Cleveland Avenue	48	45	42	52
Diverted from Woodley Road	7	14	19	10
Diverted from Cathedral Avenue	6	14	18	10

TABLE 4
EXISTING AM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	474	2.14	557	F
Westbound (Porter St.)	L	119	2.13	577.7	F
Westbound (Porter St.)	T	464	1.1	102	F
Westbound (Porter St.)	R	229	0.61	34	C
Northbound (Connecticut Ave.)	LTR	633	0.83	37.4	D
Southbound (Connecticut Ave.)	LTR	2713	0.78	15.3	B
<i>Intersection Overall</i>				109.2	F
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	117	1.1	133.7	F
Northwest Approach (Cleveland Ave.)	TR	94	0.16	17.8	B
Southeast Approach (Cleveland Ave.)	LTR	628	1.06	80.4	F
Eastbound (Garfield St.)	L	29	0.29	34.3	C
Eastbound (Garfield St.)	R	275	0.84	52.9	D
Westbound (Woodley Rd.)	LTR	121	0.39	32.1	C
Northbound (32nd St.)	LTR	10	0.06	32	C
Southbound (32nd St.)	LTR	45	0.33	36.9	D
<i>Intersection Overall</i>				76.9	E
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	289	1.19	149.2	F
Westbound (Woodley Rd.)	LTR	1	0.01	28.2	C
Northbound (34th St.)	LTR	519	0.48	9.1	A
Southbound (34th St.)	LTR	972	0.97	35.8	D
<i>Intersection Overall</i>				47.8	D

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 5
EXISTING PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	587	2	491.3	F
Westbound (Porter St.)	L	100	1.5	311.9	F
Westbound (Porter St.)	T	262	0.64	35.1	D
Westbound (Porter St.)	R	83	0.26	26.9	C
Northbound (Connecticut Ave.)	LTR	1475	0.66	21.6	C
Southbound (Connecticut Ave.)	LTR	563	0.3	8.7	A
<i>Intersection Overall</i>				125.2	F
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	249	0.78	37.9	D
Northwest Approach (Cleveland Ave.)	TR	172	0.3	19.5	B
Southeast Approach (Cleveland Ave.)	LTR	170	0.32	19.9	B
Eastbound (Garfield St.)	L	11	0.1	28.3	C
Eastbound (Garfield St.)	R	255	0.78	47.1	D
Westbound (Woodley Rd.)	LTR	71	0.26	29.8	C
Northbound (32nd St.)	LTR	6	0.05	31.9	C
Southbound (32nd St.)	LTR	19	0.13	33.1	C
<i>Intersection Overall</i>				41	D
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	144	0.47	31	C
Westbound (Woodley Rd.)	LTR	1	0.01	23.6	C
Northbound (34th St.)	LTR	1077	0.75	17	B
Southbound (34th St.)	LTR	190	0.18	8.8	A
<i>Intersection Overall</i>				17.7	B

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 6
EXISTING AM AND PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
UNSIGNALIZED INTERSECTIONS

AM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	6	N/A	7	A
Westbound (Klinge Rd.)	LTR	2	N/A	6.3	A
Northbound (Woodley Rd.)	LTR	3	N/A	7	A
Southbound (Woodley Rd.)	LTR	1	N/A	7.2	A
<i>Intersection Overall</i>				6.9	A
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0	8.9	A
<i>Intersection Overall</i>				N/A	N/A
PM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	5	N/A	7	A
Westbound (Klinge Rd.)	LTR	2	N/A	6.4	A
Northbound (Woodley Rd.)	LTR	3	N/A	7	A
Southbound (Woodley Rd.)	LTR	15	N/A	7.3	A
<i>Intersection Overall</i>				7.1	A
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0	8.8	A
<i>Intersection Overall</i>				N/A	N/A

Note: ^ Stop delay

LTR-Shared left turn/through/right turn lane(s); LR-Shared left turn/right turn lane

N/a-not available

TABLE 7

TRAFFIC ACCIDENTS SUMMARY -- (1993 - 1995)

Locations	1993		1994		1995	
	No. of Accidents	Injuries	No. of Accidents	Injuries	No. of Accidents	Injuries
Connecticut Ave. @ Porter St.	25	6	16	2	15	0
Kling Rd. @ Porter St.	1	0	0	0	0	0
34th St. @ Woodley Rd.	7	4	3	0	2	1
<i>Total</i>	33	10	19	2	17	1

TRAFFIC ACCIDENTS BY TYPE -- (1993 - 1995)

Locations	Right Angle	Left Turn	Right Turn	Rear End	Sideswipe	Head On	Parked Car	Fixed Object	Pedestrian	Overtaking	Backing	Total
Connecticut Ave. @ Porter St.	2	1	1	14	21	0	4	2	5	4	2	56
Kling Rd. @ Porter St.	0	0	0	1	0	0	0	0	0	0	0	1
34th St. @ Woodley Rd.	6	0	0	2	0	0	2	0	0	2	0	12
<i>Total</i>	8	1	1	17	21	0	6	2	5	6	2	69

TABLE 8
2017 NO BUILD AM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	560	2.93	910.3	F
Westbound (Porter St.)	L	140	2.5	742.6	F
Westbound (Porter St.)	T	548	1.23	150.3	F
Westbound (Porter St.)	R	270	0.72	38.8	D
Northbound (Connecticut Ave.)	LTR	747	0.89	42	D
Southbound (Connecticut Ave.)	LTR	3201	0.92	20.9	C
<i>Intersection Overall</i>				160.1	F
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	138	1.83	438.7	F
Northwest Approach (Cleveland Ave.)	TR	111	0.19	18.2	B
Southeast Approach (Cleveland Ave.)	LTR	741	1.25	153.8	F
Eastbound (Garfield St.)	L	34	0.4	40.2	D
Eastbound (Garfield St.)	R	325	0.99	78.8	E
Westbound (Woodley Rd.)	LTR	143	0.46	33.6	C
Northbound (32nd St.)	LTR	12	0.08	32.2	C
Southbound (32nd St.)	LTR	53	0.39	38.4	D
<i>Intersection Overall</i>				167.8	F
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	341	1.39	231.3	F
Westbound (Woodley Rd.)	LTR	1	0.02	28.2	C
Northbound (34th St.)	LTR	612	0.58	10.7	B
Southbound (34th St.)	LTR	1148	1.09	69.5	E
<i>Intersection Overall</i>				80.9	F

Note: ^ Stop delay
 L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);
 LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane
 N/a-not available

TABLE 9
2017 NO BUILD PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	695	2.81	857.7	F
Westbound (Porter St.)	L	118	1.77	426.8	F
Westbound (Porter St.)	T	309	0.76	40.7	D
Westbound (Porter St.)	R	98	0.31	27.7	C
Northbound (Connecticut Ave.)	LTR	1741	0.78	24.3	C
Southbound (Connecticut Ave.)	LTR	664	0.36	9.2	A
<i>Intersection Overall</i>				204.7	F
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	294	0.99	72.4	E
Northwest Approach (Cleveland Ave.)	TR	203	0.35	20.2	C
Southeast Approach (Cleveland Ave.)	LTR	199	0.38	20.8	C
Eastbound (Garfield St.)	L	13	0.13	29.1	C
Eastbound (Garfield St.)	R	301	0.92	63.5	E
Westbound (Woodley Rd.)	LTR	84	0.31	30.7	C
Northbound (32nd St.)	LTR	6	0.05	31.9	C
Southbound (32nd St.)	LTR	22	0.16	33.6	C
<i>Intersection Overall</i>				51.7	D
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	169	0.56	33.3	C
Westbound (Woodley Rd.)	LTR	1	0.01	23.6	C
Northbound (34th St.)	LTR	1271	0.87	22.1	C
Southbound (34th St.)	LTR	224	0.21	9.1	A
<i>Intersection Overall</i>				21.8	C

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 10
2017 NO BUILD AM AND PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
UNSIGNALIZED INTERSECTIONS

AM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Kling Road.					
Eastbound (Kling Road.)	LTR	7	N/A	7	A
Westbound (Kling Road.)	LTR	2	N/A	6.3	A
Northbound (Woodley Rd.)	LTR	3	N/A	7	A
Southbound (Woodley Rd.)	LTR	1	N/A	7.2	
<i>Intersection Overall</i>				6.9	A
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0	8.9	A
<i>Intersection Overall</i>				N/A	N/A
PM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Kling Road.					
Eastbound (Kling Road.)	LTR	6	N/A	7	A
Westbound (Kling Road.)	LTR	2	N/A	6.4	A
Northbound (Woodley Rd.)	LTR	3	N/A	7	A
Southbound (Woodley Rd.)	LTR	18	N/A	7.3	A
<i>Intersection Overall</i>				7.1	A
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0	8.9	A
<i>Intersection Overall</i>				N/A	N/A

Note: ^ Stop delay

LTR-Shared left turn/through/right turn lane(s); LR-Shared left turn/right turn lane

N/a-not available

TABLE 11
2017 BUILD (SCENARIO 1) AM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	469	1.53	282.1	F
Westbound (Porter St.)	L	140	2.5	742.6	F
Westbound (Porter St.)	T	343	0.77	40	D
Westbound (Porter St.)	R	270	0.72	38.8	D
Northbound (Connecticut Ave.)	LTR	747	0.89	42	D
Southbound (Connecticut Ave.)	LTR	3201	0.92	20.9	C
<i>Intersection Overall</i>				77.3	E
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	138	1.62	346.1	F
Northwest Approach (Cleveland Ave.)	TR	78	0.14	17.5	B
Southeast Approach (Cleveland Ave.)	LTR	705	1.19	128.6	F
Eastbound (Garfield St.)	L	34	0.37	38.1	D
Eastbound (Garfield St.)	R	320	0.98	75.5	E
Westbound (Woodley Rd.)	LTR	133	0.43	32.9	C
Northbound (32nd St.)	LTR	12	0.08	32.2	C
Southbound (32nd St.)	LTR	53	0.39	38.4	D
<i>Intersection Overall</i>				142.9	F
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	441	1.84	424.3	F
Westbound (Woodley Rd.)	LTR	259	0.8	49.9	D
Northbound (34th St.)	LTR	579	0.5	9.3	A
Southbound (34th St.)	LTR	1147	1.09	69.5	E
<i>Intersection Overall</i>				124.6	F

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 12
2017 BUILD (SCENARIO 1) PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	469	1.39	223.4	F
Westbound (Porter St.)	L	118	1.77	426.8	F
Westbound (Porter St.)	T	179	0.44	29.7	C
Westbound (Porter St.)	R	98	0.31	27.7	C
Northbound (Connecticut Ave.)	LTR	1741	0.78	24.3	C
Southbound (Connecticut Ave.)	LTR	664	0.36	9.2	A
<i>Intersection Overall</i>				67.4	E
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	294	0.92	54.4	D
Northwest Approach (Cleveland Ave.)	TR	164	0.28	19.3	B
Southeast Approach (Cleveland Ave.)	LTR	168	0.32	19.9	B
Eastbound (Garfield St.)	L	13	0.12	28.9	C
Eastbound (Garfield St.)	R	287	0.87	57.2	E
Westbound (Woodley Rd.)	LTR	77	0.29	30.2	C
Northbound (32nd St.)	LTR	6	0.05	31.9	C
Southbound (32nd St.)	LTR	22	0.16	33.6	C
<i>Intersection Overall</i>				47.7	D
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	422	1.16	126.2	F
Westbound (Woodley Rd.)	LTR	185	0.48	30.4	C
Northbound (34th St.)	LTR	1232	0.82	19.6	B
Southbound (34th St.)	LTR	224	0.21	9.1	A
<i>Intersection Overall</i>				43.2	D

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 13
2017 BUILD (SCENARIO 1) AM AND PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
UNSIGNALIZED INTERSECTIONS

AM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	7	N/A	7.7	A
Westbound (Klinge Rd.)	LTR	260	N/A	8.7	A
Northbound (Woodley Rd.)	LTR	3	N/A	7.8	A
Southbound (Woodley Rd.)	LTR	137	N/A	9.2	A
<i>Intersection Overall</i>				8.9	A
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0.01	12.5	B
<i>Intersection Overall</i>				N/A	N/A
PM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	6	N/A	8.1	A
Westbound (Klinge Rd.)	LTR	187	N/A	8.8	A
Northbound (Woodley Rd.)	LTR	3	N/A	7.9	A
Southbound (Woodley Rd.)	LTR	302	N/A	11.6	B
<i>Intersection Overall</i>				10.4	B
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0.01	13.1	B
<i>Intersection Overall</i>				N/A	N/A

Note: ^ Stop delay

LTR-Shared left turn/through/right turn lane(s); LR-Shared left turn/right turn lane

N/a-not available

**TABLE 14
IMPROVED INTERSECTIONS AND APPROACHES**

AM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 1	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	910.3	F	282.1	F
Westbound (Porter St.)	T	150.3	F	40	D
<i>Intersection Overall</i>		160.1	F	77.3	E
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	438.7	F	346.1	F
Northwest Approach (Cleveland Ave.)	TR	18.2	B	17.5	B
Southeast Approach (Cleveland Ave.)	LTR	153.8	F	128.6	F
Eastbound (Garfield St.)	L	40.2	D	38.1	D
Eastbound (Garfield St.)	R	78.8	E	75.5	E
Westbound (Woodley Rd.)	LTR	33.6	C	32.9	C
<i>Intersection Overall</i>		167.8	F	142.9	F
PM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 1	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	857.7	F	223.4	F
Westbound (Porter St.)	T	40.7	D	29.7	C
<i>Intersection Overall</i>		160.1	F	67.4	E
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	72.4	E	54.4	D
Northwest Approach (Cleveland Ave.)	TR	20.2	C	19.3	B
Southeast Approach (Cleveland Ave.)	LTR	20.8	C	19.9	B
Eastbound (Garfield St.)	L	29.1	C	28.9	C
Eastbound (Garfield St.)	R	63.5	E	57.2	E
Westbound (Woodley Rd.)	LTR	30.7	C	30.2	C
<i>Intersection Overall</i>		51.7	D	47.7	D

Note: ^ Stop delay
 L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);
 LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane
 N/a-not available

**TABLE 15
DETERIORATED INTERSECTIONS AND APPROACHES**

AM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 1	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	231.3	F	424.3	F
Westbound (Woodley Rd.)	LTR	28.2	C	49.9	D
<i>Intersection Overall</i>		80.9	F	124.6	F
Woodley Rd. & Kling Road					
Eastbound (Kling Rd.)	LTR	7	A	7.7	A
Westbound (Kling Rd.)	LTR	6.3	A	8.7	A
Northbound (Woodley Rd.)	LTR	7	A	7.8	A
Southbound (Woodley Rd.)	LTR	7.2	A	9.2	A
<i>Intersection Overall</i>		6.9	A	8.9	A
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	8.9	A	12.5	B
<i>Intersection Overall</i>		N/A	N/A	N/A	N/A
PM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 1	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	33.3	C	166.9	F
Westbound (Woodley Rd.)	LTR	23.6	C	30.4	C
<i>Intersection Overall</i>		21.8	C	54.1	D
Woodley Rd. & Kling Road					
Eastbound (Kling Rd.)	LTR	7	A	8.1	A
Westbound (Kling Rd.)	LTR	6.4	A	8.8	A
Northbound (Woodley Rd.)	LTR	7	A	7.9	A
Southbound (Woodley Rd.)	LTR	7.3	A	11.6	B
<i>Intersection Overall</i>		7.1	A	10.4	B
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	8.9	A	13.1	B
<i>Intersection Overall</i>		N/A	N/A	N/A	N/A

Note: ^ Stop delay

LTR-Shared left turn/through/right turn lane(s); LR-Shared left turn/right turn lane

N/a-not available

TABLE 16
2017 BUILD (SCENARIO 2) AM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	437	1.24	158.8	F
Westbound (Porter St.)	L	140	2.5	742.6	F
Westbound (Porter St.)	T	272	0.61	33	D
Westbound (Porter St.)	R	270	0.72	38.8	D
Northbound (Connecticut Ave.)	LTR	747	0.89	42	D
Southbound (Connecticut Ave.)	LTR	3201	0.92	20.9	C
<i>Intersection Overall</i>				64.5	E
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	138	1.58	326.3	F
Northwest Approach (Cleveland Ave.)	TR	66	0.12	17.3	B
Southeast Approach (Cleveland Ave.)	LTR	693	1.17	120.7	F
Eastbound (Garfield St.)	L	34	0.36	37.4	D
Eastbound (Garfield St.)	R	318	0.97	73.7	E
Westbound (Woodley Rd.)	LTR	129	0.42	32.7	C
Northbound (32nd St.)	LTR	12	0.08	32.2	C
Southbound (32nd St.)	LTR	53	0.39	38.4	D
<i>Intersection Overall</i>				136.3	F
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	489	2.14	559.2	F
Westbound (Woodley Rd.)	LTR	349	1.06	99.9	F
Northbound (34th St.)	LTR	567	0.45	8.7	A
Southbound (34th St.)	LTR	1147	1.09	69.5	E
<i>Intersection Overall</i>				162.4	F

Note: ^ Stop delay
 L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);
 LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane
 N/a-not available

TABLE 17
2017 BUILD (SCENARIO 2) PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	390	1.09	102.3	F
Westbound (Porter St.)	L	118	1.77	426.8	F
Westbound (Porter St.)	T	133	0.33	27.6	C
Westbound (Porter St.)	R	98	0.31	27.7	C
Northbound (Connecticut Ave.)	LTR	1741	0.78	24.3	C
Southbound (Connecticut Ave.)	LTR	664	0.36	9.2	A
<i>Intersection Overall</i>				47.9	D
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	294	0.89	49.5	D
Northwest Approach (Cleveland Ave.)	TR	151	0.26	19	B
Southeast Approach (Cleveland Ave.)	LTR	157	0.3	19.6	B
Eastbound (Garfield St.)	L	13	0.12	28.8	C
Eastbound (Garfield St.)	R	282	0.86	55.1	E
Westbound (Woodley Rd.)	LTR	74	0.28	30.1	C
Northbound (32nd St.)	LTR	6	0.05	31.9	C
Southbound (32nd St.)	LTR	22	0.16	33.6	C
<i>Intersection Overall</i>				46.4	D
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	510	1.35	205.9	F
Westbound (Woodley Rd.)	LTR	249	0.64	35	C
Northbound (34th St.)	LTR	1226	0.81	19.3	B
Southbound (34th St.)	LTR	224	0.21	9.1	A
<i>Intersection Overall</i>				64.8	E

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 18
2017 BUILD (SCENARIO 2) AM AND PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
UNSIGNALIZED INTERSECTIONS

AM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	7	N/A	8.1	A
Westbound (Klinge Rd.)	LTR	348	N/A	10.4	B
Northbound (Woodley Rd.)	LTR	3	N/A	8.1	A
Southbound (Woodley Rd.)	LTR	205	N/A	10.8	B
<i>Intersection Overall</i>				10.5	B
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0.01	14.1	B
<i>Intersection Overall</i>				N/A	N/A
PM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	6	N/A	8.6	A
Westbound (Klinge Rd.)	LTR	248	N/A	10.4	B
Northbound (Woodley Rd.)	LTR	3	N/A	8.3	A
Southbound (Woodley Rd.)	LTR	401	N/A	16.2	B
<i>Intersection Overall</i>				13.8	B
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0.01	15.3	C
<i>Intersection Overall</i>				N/A	N/A

Note: ^ Stop delay

LTR-Shared left turn/through/right turn lane(s); LR-Shared left turn/right turn lane

N/a-not available

**TABLE 19
IMPROVED INTERSECTIONS AND APPROACHES**

AM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 2	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	910.3	F	158.8	F
Westbound (Porter St.)	T	150.3	F	33	D
<i>Intersection Overall</i>		160.1	F	64.5	E
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	438.7	F	326.3	F
Northwest Approach (Cleveland Ave.)	TR	18.2	B	17.3	B
Southeast Approach (Cleveland Ave.)	LTR	153.8	F	120.7	F
Eastbound (Garfield St.)	L	40.2	D	37.4	D
Eastbound (Garfield St.)	R	78.8	E	73.7	E
Westbound (Woodley Rd.)	LTR	33.6	C	32.7	C
<i>Intersection Overall</i>		167.8	F	136.3	F
PM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 2	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	857.7	F	102.3	F
Westbound (Porter St.)	T	40.7	D	27.6	C
<i>Intersection Overall</i>		160.1	F	47.9	D
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	72.4	E	49.5	D
Northwest Approach (Cleveland Ave.)	TR	20.2	C	19	B
Southeast Approach (Cleveland Ave.)	LTR	20.8	C	19.6	B
Eastbound (Garfield St.)	L	29.1	C	28.8	C
Eastbound (Garfield St.)	R	63.5	E	55.1	E
Westbound (Woodley Rd.)	LTR	30.7	C	30.1	C
<i>Intersection Overall</i>		51.7	D	46.4	D

Note: ^ Stop delay
 L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);
 LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane
 N/a-not available

**TABLE 20
DETERIORATED INTERSECTIONS AND APPROACHES**

AM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 2	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	231.3	F	559.2	F
Westbound (Woodley Rd.)	LTR	28.2	C	99.9	F
<i>Intersection Overall</i>		80.9	F	162.4	F
Woodley Rd. & Kling Road.					
Eastbound (Kling Road.)	LTR	7	A	8.1	A
Westbound (Kling Road.)	LTR	6.3	A	10.4	B
Northbound (Woodley Rd.)	LTR	7	A	8.1	A
Southbound (Woodley Rd.)	LTR	7.2	A	10.8	B
<i>Intersection Overall</i>		6.9	A	10.5	B
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	8.9	A	14.1	B
<i>Intersection Overall</i>		N/A	N/A	N/A	N/A
PM PEAK HOUR					
Intersection and Approach	Lane Group	No Build Conditions		Build Scenario 2	
		Delay^ (sec/veh)	LOS	Delay^ (sec/veh)	LOS
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	33.3	C	205.9	F
Westbound (Woodley Rd.)	LTR	23.6	C	35	C
<i>Intersection Overall</i>		21.8	C	64.8	E
Woodley Rd. & Kling Road.					
Eastbound (Kling Road.)	LTR	7	A	8.6	A
Westbound (Kling Road.)	LTR	6.4	A	10.4	B
Northbound (Woodley Rd.)	LTR	7	A	8.3	A
Southbound (Woodley Rd.)	LTR	7.3	A	16.2	B
<i>Intersection Overall</i>		7.1	A	13.8	B
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	8.9	A	15.3	C
<i>Intersection Overall</i>		N/A	N/A	N/A	N/A

Note: ^ Stop delay

LTR-Shared left turn/through/right turn lane(s); LR-Shared left turn/right turn lane

N/a-not available

TABLE 21
2017 SCENARIO 3 AM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	560	1.78	395.2	F
Westbound (Porter St.)	L	140	2.5	742.6	F
Westbound (Porter St.)	T	343	0.77	40	D
Westbound (Porter St.)	R	270	0.72	38.8	D
Northbound (Connecticut Ave.)	LTR	747	0.89	42	D
Southbound (Connecticut Ave.)	LTR	3201	0.92	20.9	C
<i>Intersection Overall</i>				94.1	F
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	138	1.83	438.7	F
Northwest Approach (Cleveland Ave.)	TR	78	0.14	17.5	B
Southeast Approach (Cleveland Ave.)	LTR	741	1.25	153.8	F
Eastbound (Garfield St.)	L	34	0.37	38.1	D
Eastbound (Garfield St.)	R	325	0.99	78.8	E
Westbound (Woodley Rd.)	LTR	133	0.43	32.9	C
Northbound (32nd St.)	LTR	12	0.08	32.2	C
Southbound (32nd St.)	LTR	53	0.39	38.4	D
<i>Intersection Overall</i>				172.9	F
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	341	1.53	293.6	F
Westbound (Woodley Rd.)	LTR	259	0.79	49.2	D
Northbound (34th St.)	LTR	579	0.5	9.3	A
Southbound (34th St.)	LTR	1147	1.09	69.5	E
<i>Intersection Overall</i>				88.6	F

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 22
2017 SCENARIO 3 PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
SIGNALIZED INTERSECTIONS

Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay [^] (sec/veh.)	LOS
Connecticut Ave. & Porter St.					
Eastbound (Porter St.)	LTR	469	1.95	473	F
Westbound (Porter St.)	L	118	1.77	426.8	F
Westbound (Porter St.)	T	309	0.76	40.7	D
Westbound (Porter St.)	R	98	0.31	27.7	C
Northbound (Connecticut Ave.)	LTR	1741	0.78	24.3	C
Southbound (Connecticut Ave.)	LTR	664	0.36	9.2	A
<i>Intersection Overall</i>				103.2	F
Cleveland Ave., Garfield St. & 32nd St.					
Northwest Approach (Cleveland Ave.)	L	294	0.92	54.4	D
Northwest Approach (Cleveland Ave.)	TR	203	0.35	20.2	C
Southeast Approach (Cleveland Ave.)	LTR	168	0.32	19.9	B
Eastbound (Garfield St.)	L	13	0.13	29.1	C
Eastbound (Garfield St.)	R	287	0.87	57.2	E
Westbound (Woodley Rd.)	LTR	84	0.31	30.7	C
Northbound (32nd St.)	LTR	6	0.05	31.9	C
Southbound (32nd St.)	LTR	22	0.16	33.6	C
<i>Intersection Overall</i>				47.5	D
34th St. & Woodley Rd.					
Eastbound (Woodley Rd.)	LTR	422	1.13	116.2	F
Westbound (Woodley Rd.)	LTR	1	0.01	23.6	C
Northbound (34th St.)	LTR	1271	0.87	22.1	C
Southbound (34th St.)	LTR	224	0.21	9.1	A
<i>Intersection Overall</i>				43.3	D

Note: ^ Stop delay

L-Exclusive left turn lane; T-Through lane; TR-Shared through/right turn lane(s);

LTR-Shared left turn/through/right turn lane(s); R-Exclusive right turn lane

N/a-not available

TABLE 23
2017 SCENARIO 3 AM AND PM PEAK HOUR LEVEL OF SERVICE ANALYSIS
UNSIGNALIZED INTERSECTIONS

AM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	7	N/A	7.23	A
Westbound (Klinge Rd.)	LTR	260	N/A	7.75	A
Northbound (Woodley Rd.)	LTR	3	N/A	7.51	A
Southbound (Woodley Rd.)	LTR	1	N/A	7.71	A
<i>Intersection Overall</i>				7.73	A
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0	11	B
<i>Intersection Overall</i>				N/A	N/A
PM PEAK HOUR					
Intersection and Approach	Lane Group	Volume (vph)	v/c Ratio	Delay^ (sec/veh.)	LOS
Woodley Rd. & Klinge Rd.					
Eastbound (Klinge Rd.)	LTR	6	N/A	7.79	A
Westbound (Klinge Rd.)	LTR	2	N/A	7.14	A
Northbound (Woodley Rd.)	LTR	3	N/A	7.3	A
Southbound (Woodley Rd.)	LTR	302	N/A	10.27	B
<i>Intersection Overall</i>				10.14	B
Woodley Rd. & 32nd St.					
Northbound (32nd St.)	LR	2	0	11.1	B
<i>Intersection Overall</i>				N/A	N/A

Note: ^ Stop delay

LTR-Shared left turn/through/right turn lane(s); LR-Shared left turn/right turn lane(s)

N/a-not available

TABLE 24

TRAVEL TIME AND SPEED STUDY PORTER STREET BETWEEN WISCONSIN AVE. AND ADAMS MILL RD.(1.5 Miles)										
Run No.	Eastbound Approach (Midday Period)					Westbound Approach (Midday Period)				
	Trip Time	Travel Speed (mph)	Running Time	Stopped Time	Running Speed (mph)	Trip Time	Travel Speed (mph)	Running Time	Stopped Time	Running Speed (mph)
1	5'27"	16.5	5'14"	13"	17.2	5'26"	16.56	4'44"	42"	19.01
2	5'52"	15.3	5'8"	44"	17.53	6'40"	13.51	5'15"	1'25"	17.14
3	5'24"	16.7	4'53"	31"	18.43	4'52"	18.5	4'34"	18"	19.81
Average	5'34"	16.2	5'5"	29"	17.7	5'39"	16.2	4'51"	48"	18.7

Note: There was construction work on Porter Street during the speed run

TRAVEL TIME AND SPEED STUDY CONNECTICUT AVENUE BETWEEN FLORIDA AVE. AND ALBEMARLE DR. (2.5 Miles)										
Run No.	Northbound Approach (Midday Period)					Southbound Approach (Midday Period)				
	Trip Time	Travel Speed (mph)	Running Time	Stopped Time	Running Speed (mph)	Trip Time	Travel Speed (mph)	Running Time	Stopped Time	Running Speed (mph)
1	9'28"	15.8	7'5"	2'23"	21.18	11'3"	13.57	9'13"	1'50"	16.27
2	7'57"	18.9	6'20"	1'37"	23.68	9'53"	15.18	7'23"	2'30"	20.32
3	8'8"	18.4	6'51"	1'17"	21.9	8'15"	18.18	6'18"	1'57"	23.81
4	8'12"	18.3	6'52"	1'20"	21.84	9'20"	16.07	7'36"	1'44"	19.74
5	10'10"	14.8	8'2"	2'8"	18.67	9'50"	15.25	7'22"	2'28"	20.36
6	8'3"	18.6	6'47"	1'13"	22.11					
Average	8'40"	17.5	7'0"	1'40"	21.6	9'40"	15.7	7'38"	2'2"	20.1











































